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The Insanity of Youth and Other Essays

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By BAYARD HOLMES, B.S., M.D.,

Author of "The Friends of the Insane."

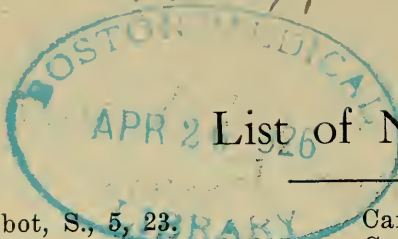
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PREFACE

This book, like "The Friends of the Insane," is composed of reprints of articles written for the most part as editorials for the Lancet-Clinic. This fact will account for some lines that the general reader may be disposed to criticize. It will also account for the lack of any logical sequence in the successive papers. The popular and the professional essays are set one after the other without any regard to the fact that they would be much more effective if they were grouped by their contents.

The many errors in these pages are also due to the exigencies of reprinting in a periodical office. It is my hope that this little book may be as effective in calling attention to the condition of the insane as my former essays seem to have been. It is essentially a plea for research.

January, 1915.

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TO
S. WARREN LAMSON
AND ALL OTHER FRIENDS OF THE INSANE
THESE ESSAYS ARE GRATEFULLY
INSCRIBED.



THE INSANITY OF YOUTH. THE ABDER-
HALDEN REACTION AND HALVAR
LUNDVALL'S REMEDY.

BY BAYARD HOLMES, M.D.,

CHICAGO.

The etiology of this insanity is looked upon by some alienists as endogenous, mental and not at all physical or toxic. It is etiologically termed by these alienists "psychogenetic." The greater portion of this group are Freudians; following avowedly or practically the great Semetic mystic, Sigmund Freud. This psychogenetic theory in one form or another was held originally for all human diseases, but as applied to the insanities it has had a continuous existence since the Middle Ages. The difficult position which its advocates maintain can best be appreciated by reading, in the light of medical history and the experience of rational mechanistic science, the writings of Heinroth, Georget, DeFleury, Marcinowski, Mary Baker Eddy, Paul Duboise, Sigmund Freud, Wilhelm Fliess and the contributors to the current numbers of the Journal of Abnormal Psychology. There has not been since the Crusade such a body of enthusiasts devoted so blindly to unreason as the Eddyites. There has not been beside the Eddyites such a cultured and literary group of medical and near-medical men and women devoted to such a fantastic phallic mysticism

as the Freudians. We must look upon Freudianism as a most fascinating neophallic sophistry.

MAGNITUDE OF THE PROBLEM.

All observers agree that there is a disease or condition, clinically termed dementia precox, apparently a loose nosologic entity, which comes on as a rule at adolescence, is progressively destructive of mind and body, practically hopeless of spontaneous recovery,¹ and heretofore without a positive diagnostic test or curative treatment. To add to the mystery of this terrible disease its origin is a matter of the greatest uncertainty. It afflicts more than twenty thousand youths a year in the continental United States, and more than fifteen thousand of them were committed to the State hospitals of the country during the census year 1910. These patients have a rather high death rate during the first year after commitment, but subsequent to that time they live ten or more years in spite of the risks and diseases incident to confinement. From these facts, it results that about six-tenths of the population of our mad houses, which was 185,000 in 1910, are cases of dementia precox.* The cause of death in more than half of these patients has been tuberculosis acquired in custody by contact and starvation.

* W. A. White, of Washington, in the preface to his great work on psychiatry says he considers insanity a word to be avoided, and Adolph Meyer, of Baltimore, would not use mental and physical as antonyms, but suggests "mental and non-mental"; so what can we say? Lunacy!

POSITION OF THE PSYCHOGENISTS.

It may seem to most physicians as an absolutely uncontested proposition that dementia precox has a physical basis. The very fact that it is a relapsing, an irrecoverable and a progressively destructive condition would seem to be enough to establish its material etiology, but psychiatrists in high places hold to the psychogenetic origin of this insanity. Becker, in his introductory lecture. "Neuere Psychiatrische Untersuchungsmethoden,"² says: "Psychiatrische Diagnostik ist gar verschieden von der der übrigen Zweige der inneren Medicin. Da giebt es keine Technik zu erlernen wie bei der Handhablung von Spiegeln, die in die Körpereröffnungen eingeführt werden; nicht einzelne Sinnesorgane des Untersuchenden zu schärfen wie beim Ueben des Augenspiegels, des Auskultierens, etc.; keine besondere Laboratoriumswissenschaft sich anzueignen, die mittels Mikroskop, Reagentien oder Brutschrank die mitgenommenen Se- und Exkrete der Patienten chemisch und bacteriologisch durchforschen lehrt." We are not then engaging in an uninspiring and unnecessary bout when we contend for the physical basis of dementia precox. On our side we have some company. Bonhoeffer³ gives us a little aid, and Goodall,⁴ Stanley Abbot,⁵ among American psychiatrists, do not give up the rational interpretation of the disease without a word. Ladame,⁶ while admitting the paucity of morphologic pathology, claims the day in the name of the secondary findings indicative of a grave toxemia. Weber⁷ recounts several cases where any internist should see in the history of previous infections a cause adequate to

produce the reduction of the brain to the condition in which it was found, everyone of these afebrile cases had a destructive myocarditis. Fleiner⁸ combats the psychogenetic theories of Duboise, and sets up his own observations of the digestive disturbances as the cause of neuroses and psychoses. We all agree that these disturbances exist, but psychologists quote the experiments of Pawlow as showing that they are secondary to the "twisted idea."⁹ Laignel-Lavastine¹⁰ shows the analogy between the adrenal dystrophies, atrophies and hypertrophies and the mental diseases, especially dementia precox.

PHYSICAL INCREMENTS.

As soon as the Wassermann reaction was established, examination of the blood and cerebro-spinal fluid was made to discover if the suspicion of our ancestors that general paresis and dementia precox appearing in the same families could be explained on a syphilitic basis. Rubinowitch and Levadili (1909) examined fifteen cases of dementia precox and three gave a positive reaction. In subsequent years the results have been various, but it is certain that the proportion of positive Wassermann's in this condition is little larger than among the sane, and does not indicate a dominant causal relation. Traumatism, the grippe, mumps, the wound infections, surgical operations, myopathy (Stransky, 1910) stomach trouble,¹¹ sexual abstinence,¹² have all been reckoned etiologic factors. Waldemar Koch¹³ showed that the chemical condition of the brain of dementia precox patients contained a characteristic sulphur coefficient. E. Meyer¹⁴ shows

that dementia precox is not a dream, but a physically destructive disease.

Austregeselo¹⁵ shows the importance etiologically of all the tropical diseases both for the acute and immediate psychoses and those that appear later. The whole gamut from malaria to sleeping sickness have their primary and their secondary psychoses in the tropics.

All authors agree that there is the greatest difficulty in making the diagnosis of dementia precox from hysteria on the one hand and maniac depressive insanity on the other. Adolph Meyer offers several intervening categories in order to relieve this tension. In nature, the lines between species, in the vegetable world especially, are not always fast and fixed. In our own experience with typhoid while we had to rely on a clinical diagnosis, we had great confusion on all sides; typho-malaria, typho-pneumonia and many other pathologic absurdities. Now, however, since we have the typhoid bacillus as the only indication of typhoid, our old troubles in nosology have disappeared, and we have paratyphoid and typhoid bacillus infections of the gall bladder and kidney pelvis without typhoid fever! Until the mechanistic etiology of dementia precox, the symptomatic clinical entity of Kraeplin, is discovered, we shall have many attempts to differentiate symptomatically between dementia precox and hysteria.¹⁶ For our purpose dementia precox consists of an undisputed group with the maximum symptoms of the disease.

The mechanistic philosopher still holds to the conviction that all the findings up to the present time,

though inadequate to suggest the etiology of dementia precox, point to a toxic process as its cause.

General paresis and the alcoholic psychoses, as well as the toxic and infectious psychoses of the psychiatrists are recently delivered from the mystical etiology of psychogenesis into the family of mechanistic and rationally interpreted phenomena.

A large group of diseases generally looked upon as due to disorders of the function of glands of internal secretion are parallel to many of the physical manifestations of dementia precox. During the past few years it is evident that these dystrophies, or, as the Germans say, dysfunktionen, are secondary to more superficial, accessible and controllable conditions. Thyroid dystrophy, for instance, is often demonstrated to be a defensive process aroused in the thyroid by a superficial infection in one of the mucous cavities of the body—in one case in the tonsil, in another case in the appendix, and in still another case in a cyst at the root of a tooth.

There is, moreover, a peculiar relation between the function of one gland of internal secretion and another; the thyroid and the thymus, the hypophysis and the sexual glands, the adrenal and the carotid glands and other combinations which immediately suggest themselves. In dementia precox the disturbances of a balanced nutrition are almost innumerable. Osteomalacia in a mild form is excessively common in dementia precox as legal investigations have shown.¹⁷ The mixed forms and unrelated symptoms are explainable frequently by the recognition of disease in distant glands. On one occasion, a boy with many

of the symptoms of dementia precox, especially the demencing symptoms and mutism, recovered completely after removal from the left side of his neck of a of a large carotid gland, weighing nearly a pound.

FIVE REASONS DEMENTIA PRECOX IS A DISEASE.

But there are now appearing growing and incontrovertable arguments and evidences for the physical etiology of dementia præcox. The first years of the century discovered pellagra and beriberi in the institutions for the insane in the United States.* Many of the patients who suffered of these diseases had entered the asylums with the diagnosis of dementia precox. These scandalous findings aroused the keepers of the insane to a fickle business toward research.

Leaving, however, these unsettled problems aside, I would call especial attention to five increments in our knowledge and resources that point strongly to our future conquest of this dark and melancholy clinical and social pest. It is a social question because the custody of our insane consumes a large part of the State budget; in Illinois, about 40 per cent. of the total State income.

THE PUPIL.

1. It has been shown by Oswald Bumke that the pupillary symptoms of cases of dementia precox appear early and are uniform, continuous and diagnostically valuable. The pupil is widely dilated, and has lost the pupillary unrest so characteristic of health.

* See author's essays on these subjects in his "Friends of the Insane," Lancet-Clinic Publishing Company, Cincinnati, Ohio, 1911.

Touch or contact reflex is lost, though reflex to light remains (except in catatonic coma) normal. This complex does not always affect both eyes equally. Sometimes one pupil is normal in all its reactions, while the other presents this symptom complex. At different times, even at short intervals, the pupil shows the greatest variation in diameter. Under mydriatics and myotics the pupil often becomes drop-shaped or slit-like. In these observations Bumke²⁰ confirms the previous observations of Westphal,¹⁸ Weiler,¹⁹ Huber, Sioli, and many others, while greatly extending and unifying the whole diagnostic phenomena. It is, of course, to be understood that this pathognomonic symptom is connected genetically with other symptoms and findings, as Kupper, in his thesis at Freiburg, 1913, on the thoracic movements, pointed out. He considered the "volumenstarre" parallel with the pupillary phenomena and probably of similar origin.

CYANOSIS.

2. The cyanosis and dilatation of the peripheral blood vessels, especially in the hands of dementia precox patients, is, when taken in connection with other findings, of great diagnostic value. It is strongly suggestive of hypophyseal disease (Marie). It seems to be the opposite of the flush of hyperthyroidism (Graves). Nevertheless, it is quite as suggestive of a toxemia, a catalepsy of the essential muscles of the circulatory apparatus.²¹ It is remarkable how early this dilatation of the peripheral blood vessels appears. The alienist does not have an opportunity to see this; the internist may if his attention is once called to its significance.

In the very early stages of the disease before any error of conduct has enforced attention on to the threatening storm of mental symptoms, the clubbing, pseudo-edema and cyanosis of the fingers, "the pupillary phenomena of Bumke," the enlarged tongue and the enlarged veins in the upper lid and the gums, ought to arouse the suspicions of the internist. This symptom was recognized by Cornell in eight-tenths of all cases. This condition calls strongly for a study of the blood. Polycythemia, leucopenia and increased coagulability will generally be found (see subsequent paragraph). In the literature and by direct information I have not found any adequate spectroscopic studies of the blood, such as Gibson²² pursued in colitis and methemoglobinaemia. In this connection and quite in accord with the general argument of this paper is the report of Mekulski²³ of a man thirty-nine years old, with the clinical diagnosis of dementia precox. This patient acquired syphilis when three weeks old. When sixteen years old, the typical symptoms of dementia precox came on, and the progress of this disease has been continuous. At an indefinite time afterward, symptoms of acromegaly appeared and have continued to burst forth occasionally in an atypical manner, but the clubbed fingers and enlarged feet, the asymmetrical jaws have been unmistakable.

The cyanosis and clubbing of the fingers, and even of the hands, remind one of the residual stage of CO poisoning or illuminating gas poisoning. This has led to some study of the gases in the blood in disease. Maass²⁴ has made studies of the permanent or fixed gases in the blood of the insane, which seem

of diagnostic and prognostic value if taken in connection with other findings. This was especially the case in epileptics and delirium tremens' patients.²⁵

THE BLOOD PICTURE.

3. In 1854, Lindsay published his little book on the examination of the blood in the insane. Little more was added to our knowledge of the morphologic changes in the blood and their significance until Bruce in his "Studies in Psychiatry," popularized the researches he had made. Dide,²⁶ after reviewing the literature of the subject and recounting his own experience, concludes that the blood findings point to an intoxication or infection. The abnormal relations of the blood corpuscles are coincident with disturbed mental conditions of the patient, and that the leucopenia is indicative of a "negative phase" in the defense made by the organism.

No contribution, however, to the clinical study of the blood in dementia precox is more enlightening than that of Lundvall.²⁷ He showed by a careful technique and the regular examination of the same group of patients over a long period of time, that there exists a "blood crisis" with each remission of the disease. During the progressive period, there is a polycythemia and leucopenia, while when improvement begins there is a return of the red corpuscles to a normal number and an increase in the white corpuscles to a number something above normal, often to 20,000. He shows this crisis by a great number of charts. Lundvall, Dide and Bruce insist on the prognostic value of blood studies, and they pronounce the

morphologic blood picture in dementia precox indicative of a toxic condition.

Since 1907, there have been numerous studies of the blood in dementia precox and other insanities, but they have only emphasized the facts previously presented.

In 1909, Much and Holzmann²⁸ discovered the very remarkable tolerance of the blood of dementia precox patients to cobra venom. This tolerance was not shown by the blood of other patients. Immediately numerous articles appeared showing a great diversity of results, all of which though indicating an abnormal resistance to the hemolysing influence of cobra venom in the blood of dementia precox patients in certain stages, vitiated the test for diagnostic purposes. Compare in this connection Spangler's use of venom in the treatment of epilepsy.²⁹

Kruger³⁰ has lately brought together the serologic evidence of the physical and exogenous nature of dementia precox, and shown the significance of coincident and related conditions, such as osteomalacia, hyperthyroidism, colitis, fragilitas osseum, rupture of the heart and affections of the sexual apparatus.

ABDERHALDEN TEST OF DEMENTIA PRECOX.

4. In his great "Handbook of Biologic Chemistry," in 1906, Abderhalden gave the first hints of the basis of his sero-diagnostic reaction. In each succeeding edition or volume, and in each of his rapidly appearing contributions to the journals of physiologic chemistry, his theory of the Schutzferments or Abwehr-

ferments † was developed and strengthened until in the spring of 1912 his complete work, a little book of 110 pages, appeared and gave to us the technique of a new and ready means of recognizing specific defense ferments in the animal body. This work attracted little attention from medical men, although it was fully appreciated by physiologic chemists, until his application of this original test to the diagnosis of pregnancy.³¹ From this time on the method has been taken up by obstetricians, gynecologists and internists as a definite part of their routine.

Fausser, of Stuttgart, following closely Abderhalden's work, first presented the subject before the November meeting of the Stuttgart Medical Society at the City Hospital, as it applied to the differential diagnosis of the insanities. His paper was published in the December 29 number of the *Deutsche medizinische Wochenschrift*, and, so far as I am able to discover, has the honor of being the first article on this rational serologic method of diagnosis in psychiatry.

He took the Abderhalden theory of dysfunction* as the basis of his study. He looked for the most likely organs of the body to furnish the antigen-like reducing material, by means of which the defensive ferment could be recognized if it existed. Taking the

† The third edition of this work has just appeared (December, 1913). It is entitled "*Abwehrfermente des tierischen Organismus.*" Berlin, 1913, p. 228. English Edition, Wm. Wood & Co., New York, 1914.

* This is a horrible hybrid word, inconsistent with good English usage but we need it, and the Germans use it. Other difficult expressions in this article are perhaps capable of better choice of words.

psychoses attending thyroid disease, the healthy and the hypertrophied thyroids were tried, but for dementia precox, with a prejudice toward the genital organs, practically every secreting gland, the brain substance, the cord, the muscles and other tissues were used, and the results were most astonishing. The Abwehrferment, the defensive ferment in dementia precox, was found to reduce the antigen-like material made from the testicle (if the patient that furnished the blood was male), and by that made from the tube and ovary (if the patient was a female).

Dementia precox patients with thyroid enlargement, sometimes gave a positive reaction with the antigen-like substance made from thyroid, either from the normal or from the hypertrophied thyroid. A few cases also disclosed a defensive ferment that would reduce an antigen-like substance made from brain cortex.

Fausser continued his studies and published his second paper, increasing his number of cases thoroughly studied to eighty-eight, in the February 15, 1913, *Deutsche medizinische Wochenschrift* (page 304).

If one stops a moment to consider the difficulty of obtaining the material for the antigen-like substances, and the large number of glands and tissue substances necessary to provide for the experimental work as well as for healthy controls, the burden of the undertaken is represented by the multiplicity of actual tests going up into the thousands, even for eighty-eight patients. This experimental work was soon followed by Wegener's brief but substantial contribution to the *Münchener medizinische Wochenschrift* for

June 3, 1913, page 1197, on the study of two hundred patients by Abderhalden's method guided by Fauser's pioneer experiments.

It is worth while in a matter of such novelty as the Abderhalden reaction to dementia precox to give a picture of the findings up to date. It is hardly enough to say that there is no conflict in the findings. Fauser's ³² third article contains little new work. He gives more theoretical observations and deductions. Schultz ³³ discusses the whole field of hematology as related to psychiatry, and shows what has already been accomplished and what must be done in the future. He mentions particularly the value of frequent examinations of the morphologic elements of the blood coincident with the Abderhalden tests. Fischer ³⁴ reviews the literature of the interval since his first paper (which paper, unfortunately, had not been accessible to me), and recites his later experience. He gives careful and explicit directions for the preparation of the antigen-like material used in the dialyzer, and calls attention to errors that may lead to misinterpretations. This article is full of valuable and practical suggestions. He reports in full the study of eighty-seven cases, eighteen of which were cases of dementia precox. The blood of every one of these reduced the testicular or ovarian antigens; a few also reduced brain cortex. He finds that all epileptics' blood reduce the brain cortex antigen-like substance every time, and rarely thyroid or other gland substances also.

Meyer ³⁵ of Tubingen, made a careful study of fourteen cases of dementia precox with various sub-

stances as antigens. Every one of these furnished blood serum that reduced the antigen substance from testicle (eleven) or ovary (three). Then, a very large proportion, also reduced antigen from human brain cortex; twelve, another large proportion, reduced the antigen of thyroid, one that of adrenal, and two males furnished blood whose serum reduced the antigen substance from bulls' testicles. One of the fourteen, a boy only fifteen years old, in the initial acute stage, within six weeks was negative once to brain cortex and twice positive; once negative to normal thyroid and twice positive to the same. No cases of manic-depressive insanity gave positive reaction to genital glands.

The results of the studies of Bundschuh and Roemer,³⁶ at Illenau, are like all the foregoing, except in one respect. Their material of seventy-two individuals was composed of nine healthy persons, no reactions; nine manic-depressives (one male, eight females), no reactions; forty-one dementia precox patients (thirty-six males, 5 females), thirty-four positive with sexual organs, and *seven were negative*; thirteen were general paretics, eleven were positive with cortex, two were negative. It is more than likely that the clinical diagnosis was not accurately made.

In the future it will not be enough to name the diagnosis and then the result of the tests. A full description of the disease should be given with all the physical findings.

Urstein,³⁷ whose great contribution to the systematic study of dementia precox is the sanest in the psycho-genetic days, appreciates fully the value of

the test in directing research and in fixing the anamnesis. As a clinical routine it should not be neglected any more than the Wassermann.

It will occur to every clinician that this reaction is likely to be of great use in predementia precox study, in the examination of first offenders, especially youthful offenders, and the misfits and incorrigibles, tramps and recluses, and other anomalous members of society. Even in the divorce courts the inadaptible member of the family may be suffering from a dementia precox not yet in a stage to be clinically recognized.

The first impressions of the utility of the Abderhalden reaction were confined to diagnosis. If the tests were made on the blood serum of a patient and it was positive or negative for the genital glands, then it was or it was not a case of dementia precox; but so simple an interpretation was soon superseded by a broader understanding. A certain woman of thirty-six years, became depressed and insane at intervals after confinement. Clinically she was a manic-depressive. She had deteriorated very much, was emaciated and greatly depressed. She gave a negative Wassermann and a positive Abderhalden to ovary, to thyroid, to hypophysis, and to brain cortex. The propriety of thyroidectomy was considered, and the enlarged portion of the gland was removed. *It was colloid and not exophthalmic-like.* Ten days after the operation she was psychically clear and made rapid improvement. A little later the Abderhalden was positive to ovary only. This case reminds one of Berkley's experience. It remains to be seen how patients with Marie's disease and ovarian tumors

respond to the Abderhalden tests, and what will be the value of these tests in the many perplexing cases of puerperal insanity and atypical cases of manic-depressive insanity.

The value of the test in diagnosis may be wholly overshadowed by its value in directing research toward etiology and cure. The remarkable uniformity of the reducing power of the defensive ferment in clinical dementia precox to the genital glands was not wholly unexpected. The Bordet-Gengau complement fixation test, with testicle and ovary for antigen, had been tried by Fauser in 1909, without uniform results, and Obregen, Pashon and Urechia (*Le Encephale*, 1913) have found dementia precox patients sterile.

ARTIFICIAL HYPERLEUCOCYTOSIS.

5. It was noticed by the older authors and at intervals up to the present time, that the febrile diseases produced quite generally a beneficial effect on the mental condition of the insane, especially on dementia precox. Becker³⁸ notices the beneficial influence of typhoid fever. It seems remarkable that although typhoid fever does not increase the leucocytes in the blood, it does often better the mental condition of the patient.

It was noticed that when an artificial hyperthermia was produced by medication with its attendant hyperleucocytosis, more or less improvement often showed itself. The use of Colley's toxine, which gained reputation in the treatment of sarcoma, produced the increase of leucocytes, and occasionally betterment.

A number of French psychiatrists have, since Dide's

review and experiments, attempted to produce hyper-leucocytosis with various substances, especially with the nucleates. Following Bruce, the English alienists have experimented with other combinations (Brown and Ross, The production of leucocytes in the treatment of mental diseases, Jour. of Mental Science, 1912, Volume 58, page 389).

One of the most recent German writers on this subject reviews the French and German literature, and then, after making less than a dozen experiments, two of which showed remarkable improvement, he concludes that artificial hyper-leucocytosis is without value in psychoses. Ittau³⁹ used fifty cubic centimeters of a .1 per cent. solution of nucleate of soda in water as a hypodermic injection. After referring to the early observations of Wagner and Lehmann that febrile diseases produced a betterment in cases of dementia precox and sometimes even wrought a "so-called" cure, Ittau raises the question of producing the same results by making an artificial hyperthermia and hyper-leucocytosis. After reporting the leucocyte findings in nineteen cases of dementia precox (he omits the red counts altogether), he reports the use of nucleate of soda hypodermically in nine cases.

The first case was an old (36) catatonic mute, cyanotic, cataleptic. Fifty c.c. of 1 per cent. solution was given at 10:00 A. M. Temperature was then 35.9° C. and the leucocyte 8,120; at 6:00 P. M., eight hours later, the temperature was 38.2° C. and the leucocytes 20,300. In three days the temperature was normal. Besides a single remark, "Es geht gut," in

reply to a question, he showed no change and made no improvement. After the second injection, he said he was homesick and voluntarily and spontaneously remarked, "Ich möchte etwas Schokolade haben." After the third injection of 75 c.c. on February 28, he remarked that he would like to play a game of chess. He did play two games of chess with an attendant, and often expressed the wish for chocolate, and showed more interest in his surroundings. Subsequent injections produced less reaction and the patient's psychic condition relapsed. The remaining cases showed the same tendency, but made no improvement. Probably the first and eighth cases were the ones that point to the possibility of betterment in the production of an artificial hyperleucocytosis.

Halvar Lundvall,⁴⁰ whose study of the blood we have noticed, has attempted with more success to produce hyperthermia and hyperleucocytosis. In eighteen well-studied cases six recovered and all but three made promising improvement. His remedy is given hypodermically as the morphology of the blood suggests in doses of two to fifteen cubic centimeters. The patient has a chill and the temperature rises to 103° F., and continues fluctuating for three or four days. The leucocytes remain up a few days longer. The remedy is highly concentrated and must be re-sterilized by keeping at the boiling point for twenty minutes before it is used. It is easily obtained from any apothecary. It deteriorates in the light and should not be kept very long before using. It is prepared by Merck (Darmstadt) in sealed glass ampulla, but it can as well be prepared where used. The injections

never result in abscesses and are rarely painful if well placed. Two concentrations are used:

	No. 1.	No. 2.
R Natrium nucleinicum.....	100.	100.
Acid arsenicosum.....	0.02	.05
Hetol	4.	10.
Aqua distillata.....	400.	400.

This remedy deserves a fair and extensive trial.

This remedy should be given in doses large enough and frequent enough to keep the leucocytes above 15,000, and it should be continued for months or years.

CONCLUSIONS.

1. The evidence accumulated taken with many other factors indicate that dementia precox is a condition or disease in which the secretions of the genital glands are greatly perverted.

2. As a part of this disturbance of the balance of the interal secretions, many other glands are coincidentally disturbed.

3. This "dysfunction" of the genital glands may be and is likely to be due to various peripheral infections, such as are found to produce "dysfunction" of the thyroid.

4. The Abderhalden reaction promises a method of diagnosis which can be applied early in pedagogic and penal, if not judicial laboratories.

5. The psychogenetic theory of dementia ought to stand aside and give way to research into physical conditions and etiologic factors and methods of prevention and cure.

6. Every institution that makes any pretense at psychiatry, even every reformatory for juvenile offenders, male or female, should have a laboratory fitted out for the "defensive ferments" reaction, and any such institution that fails to do so can not keep in the good graces of an enlightened profession and intelligent public.

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THE SYMPTOMATOLOGY AND DIAGNOSIS OF TOXIC (NON-INFECTIOUS) CHOLECYSTITIS.*

THE gall-bladder is the most passive of the three natural divisions of the biliary tract. These divisions are (1) the anastomosing bile conduits extending from each secreting liver cell to the duodenum; (2) the *vasa aberrantia*, or the redundant bile ducts ramifying in the capsule of the liver, the ligaments of the liver and the under surface of the diaphragm, and (3) the gall-bladder and its duct. From a pathological and clinical standpoint the passive gall-bladder and its duct is the most important of these three, and has secured a recognition of its importance only during the last thirty years.

The pathogenetic elements of the biliary tracts are two in number, (1) their function as conduits and receptacles of the bile, and (2) the secreting function of the mucous glands which line the biliary ducts from end to end. The gall-bladder is the only exception in this respect. It contains a few glands near the cystic duct, but the rest of its mucosa is simply rugose and distensible. The former element is mechanical, and the latter chemical. The former will not withstand obstruction, and the latter prevents the upward infection of the bile ducts, but furnishes a secretion of cholesterin, both prone to pathologic accidents.

It is possible that sooner or later we shall recognize

* Appendix to Essay on Cholecystitis.—It is of unusual interest in our research into the cause of dementia precox, that the problem of cholecystitis has now been solved. The careful reader will notice that I have referred to this cholecystitis as non-infectious, page 27. For several years I tried to grow bacteria from the gall-bladders of these my sick patients without result. With new and better methods Rose now has recently been able to demonstrate the cause.

clinically, as we have for some time observed pathologically, the various diseases of the whole trigon of the biliary apparatus; but at the present time a few conditions only that affect the bile conduits, the *vasa aberrantia* and the cystic duct and gall-bladder, have attained clinical recognition.

Cholecystitis is a condition residual to a morbidity of the greater biliary tract, and gall-stones are a symptom and following of a primary cholecystitis. However, from a clinical standpoint, any disease of the gall-bladder which gives rise to distinguishable symptoms is a cholecystitis. It may be a part of some other imperial disease, such as typhoid, syphilis, smallpox or tuberculosis, or it may be residual to one of these conditions, and, at the time of observation, be the only morbid process in existence.

Cholecystitis is a condition which presents itself in three quite distinct clinical pictures with closely related pathological findings. The first is an infectious cholecystitis, often called an empyema of the gall-bladder. It is attended by chills, fever and pain. The micro-organisms reach the gall bladder through the secretions of the liver, and in the course of a septicemic process, but they only arouse the empyema after the cystic duct becomes closed. The second form of gall-bladder disease as generally recognized, may be termed calculous cholecystitis, or gall-bladder colic. This condition may or may not be accompanied by infection of the gall-bladder, and it may or may not take on the symptoms and course of a suppurative cholecystitis. The third form of cholecystitis is the toxic (probably non-infectious) cholecystitis, of which a symptomatology is here undertaken.

During the past twenty years the symptomatology of empyema of the gall-bladder and the symptomatology of calculous cholecystitis has been so thoroughly elaborated that it would not only be tiresome, but useless to you if I should undertake to go over the ground that has already been made familiar. I will, therefore, confine myself entirely to the symptoms of the toxic, non-infectious cholecystitis.

This study of the symptoms of the toxic, non-infectious cholecystitis is based on a meager material of forty-six cases, of which thirty-two were operated on by me for drainage of the gall-bladder. Seven other of these forty-six cases were operated on by other surgeons after my diagnosis was made. A considerably larger material has passed through my hands and received the diagnosis of toxic, non-infectious cholecystitis. This material has been treated medically or disappeared from observation. Nevertheless, a few findings in these cases have been utilized in this symptomatology.

The patients with this condition generally consult a physician, because they conceive they have some sort of heart disease. When they appear in the office they are dusky, asthenic, nervous and anxious. The examination soon discloses the integrity and competency of the heart, and leads to a more systematic examination, which at once, or after a week of elimination, discloses the disease of the gall-bladder. In the thirty-two cases where operation has confirmed the diagnosis, the symptoms may be considered as objective, subjective and historical.

1. *Objective Symptoms and Findings.*—The sclera

and skin in every one of the thirty-two cases was slightly icteric. This condition was established either by direct examination, by the history of the patient, by the remarks of acquaintances, or by the subsequent result of drainage of the gall-bladder. There was not, however, in the great majority of the cases, any bile pigment to be detected in the urine. Only exceptionally, and usually after an attack of obstruction in which the gall-bladder was greatly enlarged, did bile appear in any noticeable quantity in the urinalysis report.

In every one of the thirty-two cases operated upon a Riedal's lobe had been distinctly palpated and diagnosed by auscultatory percussion, and the diagnosis confirmed at the operation. In nearly every case the gall-bladder was found sufficiently enlarged to be palpated beyond the Riedal's lobe, and on the surface of the abdomen, at one time or another during the diagnostic examination; but in quite a number of the cases this enlargement was fleeting, appearing one day and disappearing for days or weeks, and then showing up again in the same manner. In two notable cases the position of the gall-bladder was quite abnormal, extending to the middle line and almost to the umbilicus.

For the sake of continuity it is best to remark here that in every instance tenderness of the gall-bladder was conspicuous, though only a few of the patients had suffered pain which had called their attention closely to this region.

In six of the thirty-two cases the liver was markedly enlarged, especially the left lobe, and in one other case where this enlargement was present there was a cyst

of the omentum in close proximity to the gall-bladder and left lobe of the liver, which obscured the diagnosis.

In one case where the liver was considerably enlarged and had been pronounced cirrhotic, there was a considerable ascites. The patient had been twice tapped, and ten days before my cholecystotomy a quart of pleuritic effusion had been removed from the right thoracic cavity. Several other patients had hypostatic congestion at the base of the right lung.

Not one of my patients had any discoloration about the navel, often observed in calculous cholecystitis, necrosis of the gall-bladder and rupture of the cystic duct.

Most of my patients were in the fifth and sixth decades of life, but one was seventy-two years old, and one, who presented the most typical and active toxic non-infectious cholecystitis, was twenty-nine. Two patients were in the thirties. The examination of the blood was made in every one of my cases. This examination showed that the number of red corpuscles was considerably below the normal of health—4,250,000 to 3,500,000—with a hemoglobin estimation between 65 and 80, and *in every case an increase* in the leucocytes which was quite permanent, ranging between 8,000 and 11,000. The coagulability of the blood was surgically passable in all the cases that were examined, and only one patient bled (like a jaundiced patient) after the operation.

The blood pressure was taken in my more recent cases. It was never below 150 and in most of the cases it was above 180. One patient had a most remarkable blood pressure for at least two months continuously

before my operation, in spite of diet and medical treatment. His blood pressure varied from 200 to 230. After drainage of the gall-bladder and the establishment of the flow of bile from the fistula, the blood pressure went down rapidly to 165 and at the same time the albumin and casts disappeared from the urine. As long as the gall-bladder was open, which was nearly four months, the blood pressure remained low, the casts and albumin were absent and the patient was in remarkably good health; but as soon as the gall-bladder closed, his blood pressure rose and remained high until drainage of the gall-bladder was re-established. Then it fell again from 230 to nearly normal.

The most characteristic, although not absolutely uniform, symptom has been the cardiac disturbance. Tachycardia, arrhythmia and "missing of a beat" has brought most of the patients to the doctor. These symptoms have been recognized subjectively by the patient as "a distress about the heart." In some patients, who had paid no attention to this condition, sudden collapse from dyspnea (possibly from acute dilatation of the heart) has been the first symptom. In other cases some slight cough or cold was followed by cardiac distress—tachycardia and arrhythmia. This condition has been more distressing to the patient when it came on at night, after a short sleep. In one patient the distress was so great that after its first appearance about two o'clock in the morning, he was obliged the rest of the night to sit up to sleep. Every time he fell asleep in a recumbent position "he woke up because his heart had stopped." One patient had "spells of stopping of the heart," with great weakness coming on at

the most unexpected moments during nearly ten years before I operated on him. This weakness had been so pronounced that a diagnosis of locomotor ataxia had been repeatedly made, and he had been under treatment for this disease by reputable physicians as well as quacks. After the drainage he was free from cardiac disturbance, but cholecystectomy was eventually necessary on account of the obliteration of the cystic duct.

The area of cardiac dullness was usually unmistakably increased. In one case the transverse diameter of this dullness was nine inches. This patient had a tachycardia of 120 to 140. After drainage this tachycardia disappeared within twenty-four hours in an alarming bradycardia, and the heart gradually came down to the normal. This patient was so completely cured by twelve weeks' drainage that he was able to go to work as a nautical engineer. In most patients the apex is found moved toward the left and downward.

Valvular lesions from previous endocarditis were observed in at least two cases, and two other patients had murmurs from dilatation of the heart.

In the urine of a few of these patients albumin and casts were persistently present, and in one case an attack of colic was followed by complete suppression of urine for more than twenty-four hours, with an extremely slow return of competency to the kidneys. This patient was afterwards operated upon by another surgeon. Gall-stones and thick material were taken from the gall-bladder, and the gall-bladder itself was found thick, white and adherent. This patient had a complete

cessation of cardiac symptoms, and especially of "stopping of the heart," after the drainage.

The great majority, probably two-thirds, of all the patients that I have examined with gall-bladder disease, presented Ewald's area of hyperesthesia in a most unmistakable manner and some in a questionable manner. One patient, moreover, had a severe attack of herpes zoster covering this area and extending from the spine to the sternum. After the herpes had disappeared hyperesthesia remained. Three other patients complained of neuralgia of the ninth nerve on the right side. Although these instances are so rare, the relation between the ninth dorsal nerve and the innervation of the gall-bladder is so direct that even such rare cases are significant.

On only a few of my patients were metabolic studies undertaken, but they showed no deviation from the normal which our physiologic chemists could point out.

On a few of my patients where there was the slightest suspicion of syphilis of the liver, Wassermann tests were made, and although these patients were slightly jaundiced, the reactions were pronouncedly negative in every instance.

Believing that the toxins which act upon the heart, nerves and circulatory apparatus were generated in the gall-bladder, I have undertaken to use the secretions of the gall-bladder that were free from bile as well as an emulsion of the mucous glands of the gall-bladder as an antigen. The blood of three patients with cholecystitis was examined by this method experimentally. Although the blood of healthy young people, used as controls, seemed to indicate that we had a background for such a test, no reactions have been secured.

2. *Subjective Symptoms.*—Some of the subjective symptoms have already been mentioned in connection with the objective symptoms and findings. The patient usually begins his complaints by referring to the distress about the heart. These symptoms have been sufficiently noted.

Most of my patients complained of gastric disturbance, about as patients do with chronic cholelithiasis. However, none of my patients had vomiting spells, and none of the thirty-two patients mentioned had sick headache, vertigo or uncontrollable drowsiness. Nearly every one of them felt distress after eating, had eructations of gas and even of undigested food. One patient, however, had severe pain in the stomach after eating or drinking. A glass of water would bring on, not a colic, but a terrible abdominal distress. At the operation this was explained by the presence of a firm adhesion between the gall-bladder and the pyloric end of the stomach. One other patient had had so much distress after eating that he had actually starved himself into an exacerbation of an old pulmonary tuberculosis, and another patient had starved herself into a tuberculosis of the left kidney. Nearly every one of my patients have had a much better gastric and intestinal digestion after the cholecystostomy.

Several of my patients were troubled with flatulency, constipation and abdominal discomfort, which had led them to all sorts of diets and cures, and at least two of them had a chronic looseness of the bowels with occasional diarrhea that disappeared after the operation. None of the thirty-two patients had clay-colored stools, except perhaps a tendency in one or two of them to this condition after a colicky attack.

The symptoms referable to the nervous system have been of two sorts, the psychical and the local. The larger number of patients have felt great anxiety and depression, as they said, "from stopping of the heart," and they have felt rationally anxious about their condition, but none of them have been hypochondriacal or melancholy. One patient (not, however, of the thirty-two in which the diagnosis was confirmed by the operation) was not only anxious and depressed, but partly dazed, with a clouded intellect, such as is sometimes seen in the very old. His blood pressure was in the neighborhood of 200, and as soon as the cholagogue had been used and his diet regulated, the mental disability disappeared. One patient had hallucinations during an exacerbation of the cholecystitis and again forty-eight hours after cholecystostomy.

The presence of Ewald's area of hyperesthesia has already been mentioned, but the patients usually complain of a pain of a deep, "fist-like" character in this particular area, and some of them have mentioned a shooting pain on flexing or extending the body, radiating from this center.

• 3. *The History*.—The history of the patient as given by himself rarely suggests anything like a calculous cholecystitis or empyema of the gall-bladder, and it is only after the discovery of a tender gall-bladder that any suggestion of sickness in this region can be elicited. In less than half my patients has a reliable history of typhoid or other septicemia been secured, which give rise to infection of the gall-bladder.

4. *Confirmation of the Diagnosis*.—In the thirty-two cases which furnished the most of the material for

this abstract, every gall-bladder was found at the operation to be thick, white and filled with a tarry or porridge-like material which by the most careful bacteriological examination in our clinical laboratory proved



A portion of the mucosa of the fundus of the gall-bladder, with great increase in the glandular elements. x 120 dia.

sterile. Six of these gall-bladders had some adhesions, usually lace-like, but in two instances firm and strong, connecting the gall-bladder with surrounding viscera. Nearly all of the gall-bladders contained a crystalline precipitate of cholesterin; only a small proportion,

however, probably less than one-third, furnished any calculi. The thickness of the gall-bladder wall was quite variable, but it was always two millimeters thick in spite of great dilatation, and in one case it was at least a centimeter thick, and contained a few drachms of clear viscid material. Most of the gall-bladders were two or three times as large as normal, and one in particular was so large that it jumped through the inch and a half incision and extended two inches and a half beyond the abdominal wall. An eight-inch forceps would not measure its length. The contents of some of these gall-bladders was in two layers, a clear, oatmeal-like layer at the top and a dark, tarry layer at the bottom.

My operation was a simple cholecystostomy, varied from the custom by the removal of a small bit of the fundus for microscopical examination. While the whole gall-bladder ordinarily is as thin as three layers of tissue paper, and is wholly devoid of mucous glands at the fundus, with only twelve to twenty such glands near the cystic duct, the pieces which I have recovered have uniformly been crowded with these mucous glands, some of them extending through the muscularis, and in one case at least containing calculi. These glands are composed of cylindrical epithelium which is studded from the nucleus to the cuticula with little crystals of cholesterin, which, paradoxical as it may seem, are liquid. They polarize light. Some of the glands that were occupied by calculi have undergone an atrophy, so that the stones seem to be surrounded with pavement epithelium. The accompanying photograph shows the crowded condition of the glands in the fundus of a gall-bladder removed from a young

woman who suffered of tachycardia and nervous symptoms closely resembling exophthalmic goiter.

Only one of these thirty-two gall-bladders had to be extirpated on account of the permanent obliteration of the cystic duct.

RESULTS.

One patient only, a man of seventy-two, died on the table, at the end of a five-minute gas anesthesia and after the operation was finished. One patient after being well six months submitted to a second operation on an erroneous diagnosis, and died of the anesthetic. I had an opportunity to make an autopsy on this patient, and had the material carefully examined. Although he was a man of sixty-two, and had suffered of severe cardiac symptoms for six months, with angina-like attacks, enlargement of the liver and edema of the lung, the coronary arteries were free from atheroma, the kidneys were in the most moderate condition of interstitial nephritis, and the myocardium showed a general but not an excessive disease. This is the only autopsy that has been made upon any of the thirty-two cases. One of the thirty-two, after having four years of healthy activity as a nautical engineer on Lake Erie, contracted an acute broncho-pneumonia, of which he died. One of the earliest patients in this series lived two years in relative health, but at last, through the progress of the phthisis which the gastric distress had initiated, began to cough, and his heart was unable to withstand it. All the rest of the thirty-two patients are alive.

In none of the thirty-two cases referred to was an error of diagnosis discovered at operation, but in a case of gall-bladder disease which I had placed in this cate-

gory originally on account of the nervous symptoms, a Wassermann later showed the presence of syphilis, and a rapid disappearance of reaction in the pupil and the spinal nerves developed the oncoming locomotor ataxia. In still another case outside this series, eight months after drainage of a calculous bladder, carcinoma of the greater curvature of the stomach was discovered.

CONCLUSION.

I am convinced that there is a morbid process which is initiated by some irritant in the mucosa of the gall-bladder, which results in an enormous multiplication of mucous glands in this viscus; that this results in the secretion and excretion of toxic materials into the gall-bladder by these glands, which toxic materials are so absorbed by the tissues of the patient as to result in a general toxemia, and that this toxemia produces a train of symptoms which I have undertaken to bring together in this paper. It seems to me that the reason these symptoms are produced rests upon a selective action of these toxins upon the heart and the centrally located blood-vessels and upon the nerves which are cognate with those that supply the gall-bladder through the sympathetic plexus. It is possible that the mucous glands of the other two portions of the biliary tract are concerned in the glandular hyperactivity or possibly glandular perversion. The relation between the symptoms and the gall-bladder disease has been sufficiently demonstrated by the result of cholecystostomy and protracted drainage.

THE EDUCATION OF EXAMINERS.

THE written examination has become a sort of fetish, and is believed by many pseudo-sociologists to contain the spirit of all good government. The efficiency of the public service of the United States was unequalled during the first thirty-six years of the republic. The spoils system began in 1829, when there were less than 40,000 public servants. At the present time there are almost ten times as many "classified" public servants under civil service certificates. The forty-five States of the Union now license physicians to practice medicine on an examination, which usually occupies three days. Each examination consists of ten questions in each of ten or more arbitrary divisions of the science of medicine. Scarcely a State board requires any practical demonstration of the skill of the neophyte, either in the clinical laboratory or the obstetric manikin or at the bedside. It is a remarkable fact that the catechismal examinations of our State boards are passed with higher marks by the inexperienced recent graduate than by the more experienced internes and hardened practitioners.

Recently the medical schools have been berated in the public press and by ponderous and thunderous doc-

uments, but no words of condemnation have been given the examining boards. Yet no single influence has been so disastrous to high pedagogic adventure in medical education as the catechismal examinations of the State licensing bodies. The one idea that faces the student in his four years of study is this antiquated written quiz. The whole medical curriculum has been reduced to promoting skill in answering categorical questions, any effort in the direction of education, any effort toward scholarship is unwelcome to the student and unappreciated by the college administration.

The observer of medical affairs during the last few *décades* cannot fail to recognize the lower standing of our profession in character, public spirit, social position and scholarly reputation. The examinations have multiplied, but the medical neophytes are far short of the ideal. They complain justly of their imperfect training, the profession suffers from their low commercial and tradesmanlike ideals. The public is baffled when it puts such confidence in the new licensee as the old doctor, by long years of integrity and devotion, had won for the very name physician.

* * *

In the United States, written examinations for entrance to college were required in Latin, Greek and mathematics about the beginning of the nineteenth century. The mathematics consisted of arithmetic alone or arithmetic and a little algebra. The Latin and Greek were translated at sight to and from English. The whole examination was brief, and often sup-

plemented by oral examinations and general conversation that penetrated further than any written examination ever can into the "general intelligence" of the applicant. The entrance examination for colleges increased in number and extent until about 1898, when the colleges united into an association for the purpose of unifying the examinations and assigning topics for some years to come, which should furnish the basis of the examination each year, especially in English, Latin and Greek.

Nevertheless, there has been the greatest dissatisfaction with these entrance examinations. Teachers have complained that they did not keep out the unfit, and investigators like Thorndike, after studying the grades of graduates for several years, declare that those who entered on the lowest grades were quite as apt to do good work in college and graduate with honor as those who entered on much higher or the highest grades.

Some of the colleges, following the University of Michigan, have examined the facilities of tributary high schools and accepted the students recommended or graduated by them without any examination at all. This method has been quite as satisfactory as the former method.

Some colleges combine the two methods for the admission of students, while others, like Harvard, have two or three wholly distinct systems of examination for admission, by recommendation from accredited schools, by examinations on the plan of the Association of Col-

leges, and by specially designed plans of their own. All in all, the conditions and the discussions in the educational journals discover general dissatisfaction with all systems of examination as now practiced, and Prof. Cattell, of Columbia, expresses best the opinion of educators when he says that it seems to be absolutely impossible to determine the fitness of a student to take a college education by means of any known form of written examination.

China began a system of examinations for candidates for the civil service as early as the Chou dynasty, nearly twelve hundred years before Christ, and these examinations continued almost uninterruptedly until 1906. They grew in conventions and restrictions, and were well adapted to test the knowledge the candidates possessed of the classical philosophers and determine their ability to execute certain literary feats. One of these feats, which was termed wen chang, or "the eight-legged essay," was a most remarkable sonnet-like composition required to be written in a day and a night, after certain introductions in eight equal columns of Chinese characters of the same class and related significance and construction. In the nineties this particular test was abolished by the edict of the Emperor Kwang Su, or Kuang Hsu, but was restored in the usurpation of power by the empress dowager. The peculiar autogenous and isolated civilization of China was preserved until after the Boxer uprising by the inflexible system of examinations for the civil service, at the summit of which was the Hanlin. The

present fall of the Manchu may be laid to the conservatism which the written examinations intensified.

* * *

America was lost to England largely through the incompetency of the military, naval and civil officers appointed by George III. His favorites and personal friends filled responsible places, for which they had no other recommendation. Equal disorder and disorganization prevailed in India. The misgovernment that resulted and the expensive rebellions that followed roused parliament to initiate a less corrupt system. In 1855 the first imperial civil service examinations were held. In 1874 they were greatly extended and improved. By this system the seven thousand Englishmen who rule the two hundred million inhabitants of India are selected. All the civil and military officers of the empire are filled on merit and largely by examinations.

There is very great dissatisfaction with the results of the examinations, and the probationary periods and election periods are provided to prevent some of the faults of the system from producing too great disaster.

* * *

It is only during the past few years that examinations of mental attainment have been studied scientifically. Galton early (1836) suggested the possibility of measuring general intelligence or "faculty," as he termed it. In this country a large number of school children were (1882) measured physically, and attempts made to measure their mental powers. France

and Germany followed, but the results were so inexplicable and confusing that the practice was abandoned. Karl Pearson introduced in mental measurements the methods of mathematic analysis used in biometrical problems, and he has solved many of the confusing findings of the early statistics of mental measurements, and places the whole subject in a much more scientific position. William Brown has analyzed the factors and fluctuations of the examination problem, and defined the limitations of each, inside of which desirable results may be rationally expected.

It is not possible to present these factors fully in this brief essay, but some points may be useful to the reader.

1. The candidate group must be homogeneous and co-ordinated. Benet and Simon's tests for the early years of life are now well known and much used, and show how foolish it would be to present tests of the six-year group to a class of fifteen-year-old boys. It is equally absurd to present to mixed groups of six-year, eight-year and fifteen-year-olds questions adapted to fifteen-year-old boys.

2. The subject or science on which the candidate is to be examined must be a homogeneous entity.

3. The candidate's attainment of the facts of the science is *one* of the objects which an examination may most easily discover.

4. The faculty, power, promise of usefulness or command of attainment is not so easily discovered, yet it is

the possession of this potency which it is the function of most examinations to discover.

If examiners would examine their own work with the skill and pertinacity of the biometricians they would find that they could determine within some latitude the correctness and value of their own work. If one hundred candidates for the license to practice medicine, *e.g.*, are examined, their papers in *any one subject* can be arranged in a series by the simple method of "paired comparison." Two papers are taken at random and considered; one is manifestly better than the other. They are so marked and placed. The same procedure is executed with every other pair. The papers are now in a series, the best at one end, the poorest at the other, but the difference between succeeding papers may not be the same in the middle of the series as between pairs at either end. If now this series is applied to the curve of probability (barring exceptional excellence, which can be easily recognized), it will give the proper grading of the candidates or it will show that the examiners have failed to present a proper set of questions. Sargent, who has supervised the English civil service examinations in South Africa since the war, decided that a failure of the "curve of results" to closely follow the "curve of probabilities" was *prima facie* evidence that the examiners had erred in the questions presented or been led astray in the method of marking.

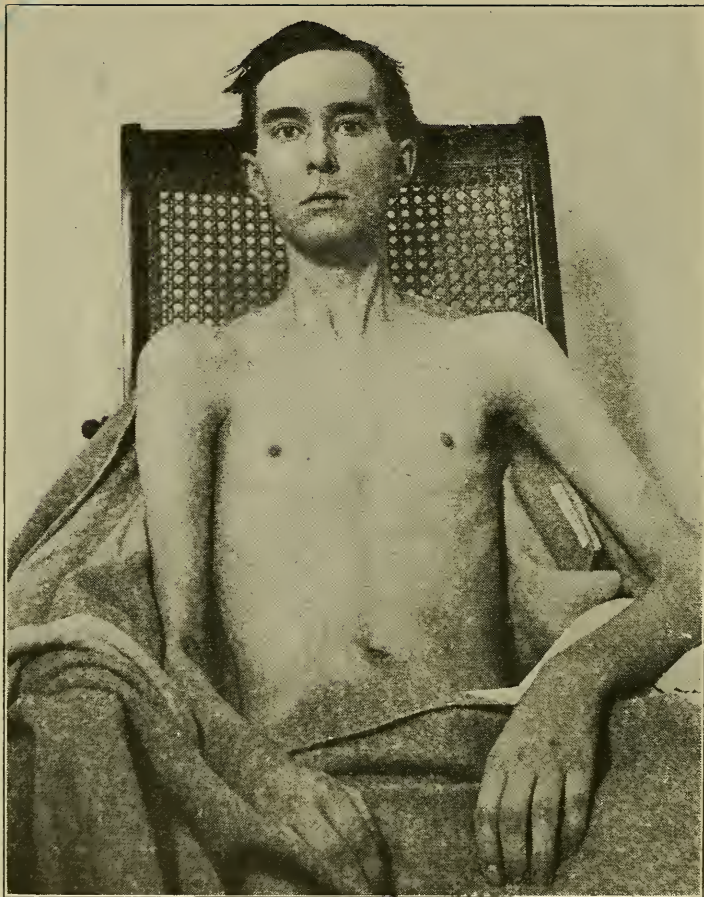
One of the greatest labors of our past individualistic civilization was the establishment of the law and the

judiciary. The courts, as we have them, are largely concerned with the conduct of a small fraction of society—a sort of vestigial remnant of unassimilated savagery or barbarism—and they measure crimes and torts which are pathogenic products of our association.

In the new civilization for which we have as yet no name, there must be established a new judiciary to measure and judge the commendable acts and conduct of the majority of citizens, and award them such opportunities of service to the State and society as their several talents, attainments and potentialities warrant. The new sciences of experimental psychology and applied biometrical mathematics furnish the material of yet unassembled facts, out of which the new science of mental measurements must be eventually built up.

If we fail to make our examinations scientific and potential in bringing into public service the very flower of our intellectual, cultural and ethical training in home, school, factory, counting-house, atelier, laboratory and field, then we shall deserve the fate of China; and one of the early signs of that impending catastrophe will be recognized when our civil service bureau becomes a sort of Aryan Han lin.

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A Case of Mutism for Seven Months.

TRUNK ANESTHESIA.

A CASE OF MUTISM FOR SEVEN MONTHS—FORCIBLE CLOSURE OF THE LIDS FOR THE SAME TIME—UNWILLINGNESS TO TAKE FOOD IN THE PRESENCE OF OTHERS FOR NINE MONTHS—ALL CURED IN TWO WEEKS BY SUGGESTION, UNCOVERING EVIDENCES OF ABSCESS IN THE RIGHT SIDE OF THE BRAIN, PROBABLY DUE TO OTITIC ORIGIN—OPERATION, RELATIVE RECOVERY.

By BAYARD HOLMES, M.D.,

CHICAGO.

GALE D—, 18 years old, the younger of two brothers, was born at Whitefield, Ill., and has always been a well though not a very strong boy. He was active in spirits until 13 and a good shot and devoted hunter. He was bright in school, but rather bashful. He was tall and weighed about 145 or 150 pounds. His father is a blonde, German appearing man, weighing nearly 200 pounds, who has healthy brothers and sisters, but two uncles who have become insane in their old age. His mother is a brunette weighing about 95 pounds and has been troubled for many years with indigestion and sick headache. It is easy to make a diagnosis of gallstones in her case. Her family is a rather sturdy, active and wide-awake lot of people, without any hereditary taint of any kind except possibly two cases of consumption.

During the summer of 1905, when he was about

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13 years old, Gale met with some accident which his family looked upon as trifling. He looked upon it as the cause of all his trouble. In September, 1909, he came to Chicago and consulted Dr. William E. Quine, who said that the boy had heart disease and that he ought to go home and remain in bed for some weeks.

While in bed his father discovered that there was a very bad smell coming from the bed and after close inquiry found that the boy was troubled with a suppurating paraphymosis. He was circumcised by two doctors from Henry, Ill., but the wound did not get well until April, 1910. During this time he remained much in bed and got into the habit of eating in his room and refused to eat at the table with the family.

Some doctors known as Chiropraths took him to Davenport, Iowa, and kept him there for two months. About the first of July he escaped from the Chiroprathic place and ran some distance in the street and pounded his own head with a brick or stone. He was said to be running for the river to drown himself. When he was picked up by the police he was carried to a Catholic hospital. The hospital authorities telephoned his father that he was in a dying condition and that he could not be removed, but on July 6 he was taken home, a distance of more than fifty miles, in an automobile.

When he got home Dr. Hess saw him and found that he was dreadfully emaciated, that he had sores on his lips, and that he had retention of urine, involuntary discharges from the bowels, with rapid pulse and low fever. He was placed in a tent in his father's dooryard and carefully attended to. On his arrival from Davenport he was perfectly mute, his eyes were forcibly closed, he refused to

move, or at least did not move in any person's presence, and lay in a comatose condition all the time. He could not be fed, but if a meal was set by the side of his bed he ate it. During the months of July, August, and September he made great improvement and was believed to weigh as much as 135. During all this time he never spoke except once, when he called for more to eat to his mother, who was just outside. He never ate in his mother's or father's presence and no person visited him except Dr. Hess. During all this time, also, he never opened his eyes in any person's presence. He was quite tidy after the first two weeks at home and used the chamber which was kept conspicuously by the side of his bed. He had always been myopic and he wore his glasses all of the time except in the night. He never took them off himself, but he would put them on early in the morning. Dr. Hess considered it a case of *dementia præcox*, but claimed no special skill.

I first saw the patient with Dr. Hess on February 9, 1911. Gale's eyes were closed, he lay in bed with a pulse of 88 and a normal temperature. On raising the lids the pupils were seen to be distinctly dilated. They responded sharply to light and seemed to be equal in every particular. I found the abdominal, the scrotal, the patellar, and the ankle reflexes normal, or thought them so. There was, however, almost complete anesthesia from the neck down, except upon the fingers and toes and the bottoms of the feet. I was able, without his flinching, to thrust needles through the skin that I picked up on his arms and legs. However, he did respond to light touches and seemed to enjoy having his legs moved passively. I was unable to get him to open his mouth or to speak a word or swallow a particle

of water or milk. Nevertheless, while I was out of the room he ate a moderate breakfast. After breakfast I went over the examination again and concluded it was a case of hysteria. I alarmed his family by asking for his clothes and after dressing him I placed him on a horse and took him for a little ride. When he came back alone with the horse he was holding the lines and his brother said his eyes were wide open as he approached the barn.

A short time later I brought him to Chicago. He walked to the train, from the train to the carriage, and from the carriage into the hospital. On admission he weighed 95 pounds. For three weeks previous to his entrance to the hospital he had vomited every time any one went into the room and he had lost greatly in weight and strength. His eyes were closed, it was impossible to get him to open his mouth except by force, and he would not drink or eat anything even though it was left near him. During the first twenty-four hours in the hospital his stomach was washed out three times a day and filled with a pint of eggnog. Every time he vomited this eggnog another pint was put in his stomach with a stomach tube. At night he had a large enema consisting of four quarts of hot water, twice repeated one after the other. On the second day I suggested to him that he could open his mouth and eat and so far succeeded, with the help of Dr. P. G. Kitterman and two nurses, that we were able to feed him a full meal of solid and liquid material. We suggested at the same time that he could not vomit this and he did not vomit after that time. Twenty-four hours later we suggested to him in the same manner that his eyes would open and they did open and have remained open ever since. He walked around the hospital from room to room.

He was still anesthetic and I frequently demonstrated this anesthesia to physicians. He was still mute and I suggested that three days later he would begin to talk. He did begin to talk and since that time has responded to questions after considerable urging and has shown some emotion, crying about his conduct on two or three occasions. At the end of the second week his physical examinations had shown a pulse continuously in the neighborhood of 120, his temperature was slightly fluctuating and was taken by the rectum. It was not more than a degree above normal at any time and never subnormal. From the time that he entered the hospital up to the end of the third week there were frequent occasions when his breath was distinctly strong of acetone. During all this time he had a leucocytosis of 12,000 to 24,000—one count which must be looked upon as absolutely reliable was only 4,400. The polymorphonuclear neutrophils were 89 per cent. and there were no eosinophiles.

About two weeks after he came to this hospital the results of our examination showed a uniformly high pulse 110 to 120, a uniformly increased leucocytosis, 12,000-24,000, a blood-pressure of 120, a stationary weight in spite of forced feeding, and a hebetude which was hard to overcome and from which it was difficult to arouse the patient to answer questions. He now began to fall down when walking, but never in a manner to suggest a lack of equilibrium. It seemed that the falling down was the result of a suggestion made during a visit to one of the patients who had a resected knee. Two or three shocks from the coil restored his legs to activity, and he would walk around and only fall in the presence of other people. During ten days he had hot and cold spray to the back and general

massage. During this time he talked with the masseur, Mr. Grimstead, and told him a great many things about his mental life during the time he was mute and had his eyes closed. He felt very sorry that he had caused his family so much trouble, and cried on several occasions.

Mental and Neurological Examination by Dr. Ralph Hamill of Gale D—, Saturday, February 25, 1911.—Patient just returned from hydrotherapeutic treatment. Speaks in whispers, answers sometimes prompt, sometimes delayed, usually correct and to the point, occasionally a tendency to show relevancy without exactness (suggesting Ganser symptom). Asked if he ever heard voices said, "Yes, sometimes." "Whose are they?" "I don't know." "Where do they come from?" "The next room." "Where else?" "The hall." "What do they say?" "They tell me to quit." Another time: "Quit it." "Quit what?" "Seem to know what I'm doing." "What were you doing? Were you doing anything bad?" "They told me to stop when the stuff was running out of me." "What do you mean?" "When I soiled the bed." "What else did they say?" "They told me to let it alone." "What do you mean?" No answer. Finally it came out that a voice seemed to come through the door of the bathroom telling him to stop masturbating. Thinks it might have been the voice of a servant, *i.e.* hospital orderly, though he says the door was closed. Asked why he stopped eating, said it was because he thought that might stop his soiling the bed and vomiting. Answered that voices seemed to tell him to stop eating. Oriented fairly well as to time and surroundings. Asked to shake hands, made no move. Examiner's hand held directly over his hand, no move, with slight pressure beneath

his hand it was gently started toward examiner's hand and patient completed the act. During the examination patient's behavior was completely free from motor acts, simpering, foolish smiles, turning of the head, etc.

Stroking the left foot sole caused first slight plantar movement of entire great toe with subsequent slow dorsal flexion. After two or three strokes, motion was entirely dorsal. Right always plantar. No Achilles reflex, no knee reflexes. Patient could not be made to use Jendrassik. Wrist, biceps, and triceps taps reduced but equal. Abdominals reduced and equal. Cremasterics ditto. At times pupils showed slow contraction and relaxation; reacted well to light and convergence. Patient could not be gotten to make extreme lateral movements with the eyeballs. Lesser movements showed no abnormalities. Ophthalmoscopic examination showed nerve heads white, no physiological cups, outlines very indistinct, vessels approximately normal. No apparent difference in cranial nerves. In attempting to walk with support, legs tended to hyperextend at knees, but all movements are very feeble. Passive movements are resisted. No apparent abnormality to coarse sensory tests. Diadochocinesis could not be tested for. Fine tremor in both hands. Turning chin over either shoulder causes no dizziness nor nystagmus. Visual fields + to finger test. No hemianopsia.

February 27.—Patient just returned from laboratory. Reflexes as above. Patient would not answer questions. Attempts to make him follow with eyes to lateral positions unavailing. When the chin was turned over either shoulder by the examiner the patient would maintain position indefinitely. The patient can tell the color of flowers, red; also the

color of paper cover on the flower pot, green. He writes his name here.

Both pupils react to light and accommodation and dilate on stimulation of the sympathetic, pinching the cheek. The media are clear. The optic nerve heads are too white—a greenish white, the outlines of the nerve head are gone. There is no physiological cup; the nerve heads are slightly swollen. The relative size of veins and arteries is out of the normal—veins too large, therefore, secondary optic atrophy.

On February 22 the same examinations were conducted by Dr. Pusey and the previous findings confirmed. He said at that time, and wrote upon the history, "This probably means a localized process in the cranial cavity and a recessive one, such as an encapsulated or absorbing abscess. The duration of the process that has caused the optic atrophy could hardly have been less than two months. The atrophy is more marked on the right side; the swelling of the nerve head is a little more marked on the left side. According to Horsely, this would mean a right-sided lesion." The patient was weighed at this time and found to weigh only 96, stripped. All the blood, urinary, and serolytic examinations were repeated. Dr. Dennis examined the ear drums and considered them both normal except for retraction. There is no indication of perforation.

Several test meals were given and one of them, on February 6, is recorded as follows: Ewald, 30 c.c. brown color, two layers well digested in fine state of division with no frothing. It had a sour odor on removal. There was no swallowed mucus and only a moderate amount of stomach mucus. There were no blood clots or pulpy ground material,

and no fragments of mucous membrane. The microscopical examination showed a few squamous epithelial cells, but no cylindrical cells or pus cells, no blood; no Opler-Boas bacilli, no sarcinæ; a few yeast cells and a few other bacteria; no muscle fibers, but a few starch granules. The clinical examination showed an acid reaction to litmus and to Congored. The total acidity was 30. The dimethylamidoazobenzol hydrochloric acid reaction was negative. There was no free hydrochloric acid, but a moderate reaction to lactic acid. No blood and no bile.

The examination of the urine was repeatedly made and was quite uniform. Just before the operation a single specimen was of an amber color, of slightly acid reaction with no sediment, slightly cloudy, strong urinous odor, specific gravity 1.025, with no albumin, no sugar. The urea was not estimated and there were no other abnormal constituents. The centrifuged sediment contained no casts and no blood cells, very few pus cells, occasionally squamous epithelium, and a few mucous shreds.

The blood examinations, as we have previously mentioned, varied between 5,260,000 reds, 24,400 white, 14 per cent. lymphocytes, 86 polymorphonuclear neutrophils, hemoglobin, 85 per cent., Dare; and 4,700,000 reds, 4,400 whites, 17 per cent. lymphocytes, 13 per cent. large mononuclear, 69 per cent. polymorphonuclear, and 1 per cent. eosinophiles. Several blood cultures were made and all found negative. There were no indications of endocarditis, as repeated examinations of the heart showed, and no evidence of enlargement of the spleen and liver. No stools were examined.

It seems that the following negative results of our examination can be distinctly set forth: (1)

There is no tuberculous disease in the boy's body, as the careful and repeated examination of the lungs, the testicles, the two kidneys, the seminal vesicles, and the lymph apparatus generally demonstrates. The condition of the blood (leucocytes 12,000-20,000), the negative effect of tuberculin injections, and the Pirquet reaction all are against tuberculosis. (2) There is no evidence of septicemia as demonstrated by two blood cultures, by the absence of auscultatory signs of endocarditis, by the absence of bacterial nephritis, by the normal size of the spleen and liver, by the absence of tenderness over the appendix, the gall bladder, the liver, and the kidney region. (3) There is no local infection in any extremity as demonstrated by careful examination of the digits, the joints, and the inguinal and axillary lymph glands. (4) There is no infection in the chest or abdomen, as a careful examination of all of the accessible and probable foci clearly demonstrated. (5) There is no serious blood disease such as syphilis, lead poisoning, chlorosis, or the more conspicuous parasitic infections, since there is no abnormality in the blood or lymph apparatus, and the Wassermann test is distinctly negative. (6) There is no contraindication in the condition of the heart or the lungs to a general anesthetic. (7) There is no evidence of disease of the cord.

It seems that the following positive indications exist as a result of our combined examinations: (1) The leucocytosis, the slight variation in temperature, the history of sweats, all stand for a pyogenic infection. (2) The condition of the fundus, the pupillary conduct and reaction, the absence of patellar reflexes, the occasional tremor, the presence of Babinski, all localize the infection inside the

cranium. This is also consistent with the mental hebetude and the secondary psychosis. (3) The absence of vertigo and incoordination, and the absence of localizing motor symptoms suggest the hypothetical abscess in the frontal lobe or at least in the cerebrum. (4) The Babinski on the left side, the condition of the fundus oculi, the history of the suppurative otitis media, all suggest the abscess upon the right side of the brain and in the right cerebrum. (5) The presence of acetone in the urine and the peculiar odor of the breath are all significant of abscess of the brain.

Taking all these positive and negative findings into consideration, we must say that the great probability is a pyogenic infection in the right half of the calvarium from an antrum disease which may or may not be associated with a hemorrhage or incysted hemorrhage in the neighborhood of the petrosa, due to the accident which occurred in 1905, six years ago.

There are three distinct forms of infection which must be looked for, a sigmoid sinus thrombosis which may extend into the neck and obliterate the jugular, or may extend to the torquellar and up the superior longitudinal sinus, or may extend from the torquellar to the left and obliterate the lateral sinus on that side; in the second place it may consist of an extradural abscess in the middle fossa (this may be directly connected with the sinus thrombosis); or in the third place it may be due to a true cerebral abscess which has arisen from the migration of bacteria from the petrosa into a residue of hemorrhage due to the accident or into a non-resisting space in the frontal lobe, the tract of which infection has now become perfectly normal tissue.

The course of the operation should then be an ordinary évidement of the mastoid, opening of the sigmoid sinus, the obliteration of any infection thus discovered by a ligation of the jugular deep in the neck and the opening of its peripheral end in the upper corner of the wound after the ligation. In the absence of sinus thrombosis, the middle fossa should be opened to discover any extradural abscess which may have arisen from the perforation of the antrum or the tegmen tympani. If no extradural abscess is found then the middle lobe and the frontal lobe of the brain should be carefully explored with the aspirator and the latter approached through a second opening in the parietal region in front of the ear. A sinus thrombosis of such extent may be treated by the method of canalization which I suggested in the *Journal of the American Medical Association*, January 13, 1906.

Seven skiagraphs were made of the head in various positions. Dr. Lewis and Dr. Max Richmann thought that there was indication of a fracture six inches behind the glabella, about an inch and a half in extent, but subsequent skiagraphs did not support this diagnosis, and when the operation was performed no evidence of such displacement of the lower table of the skull could be determined. The mental condition of the boy was not such as to make it possible to examine the condition of his internal ears. The only thing we could feel confident of was that there was no vertigo or other symptom which would indicate disease of the labyrinth.

I had the support and advice of Drs. Brown Pusey, Ralph Hamill, Besley, Dooley, Howard Hess, and several visitors during the operation.

The patient was prepared for the operation by

shaving the head completely and giving the ordinary intestinal flushing. Under ether anesthesia the right mastoid was approached by the usual incision, the fleshy meatus was cut across, and the ear was turned over onto the face. The posterior part of the mastoid was then rapidly chiseled away with a large chisel and hammer. The air cells were found to be of enormous size, the walls extremely eburnated, but no evidence of pus in any of them, or even of an old infection in the form of cholesteatoma or residue.

With a smaller chisel the antrum was carefully approached, and found equally empty of infectious residue. In the course of these procedures the sigmoid sinus was exposed for three-quarters of an inch. It showed no evidence of infection. The middle fossa was now opened in close proximity to the antrum. The dura gave no evidence of thickening or of any infection. A small slit was made in the dura and a considerable quantity of serum poured out. A blood vessel of the pia was accidentally wounded, which made it necessary to pack this wound to stop the blood. The sigmoid sinus was now opened with a Hagedorn needle. It bled freely, showing that there was no thrombus in the sinus. The wound was now packed with a strip of iodoform gauze and the incision was closed, bringing the ear back into place.

We now made an incision over the posterior part of the frontal lobe and the frontal part of the middle lobe, reaching down to a point immediately in front of the middle meningeal artery, giving us a flap two inches and a quarter long and an inch and a half wide, with its base containing the branches of the temporal artery. The bleeding was trifling and was controlled with forceps. A smaller

incision was made in the skull with the small trephine and a de Vilbis machine. When the flap of bone was turned up it broke, but hung by the temporal muscle, which was attached to its lower half. The surface of the brain did not protrude as if under great pressure. The dura was white, smooth, and unattached to the surrounding skull. Two small incisions were made in the dura and the meningeal fluid poured out rather freely.

The aspirator was now introduced for a distance of two and a half inches into the brain and toward the base, and two drams of a clear fluid, believed to be meningeal fluid, was withdrawn. It had no odor. More than 20 other punctures of the brain were made in all directions, and only once was any fluid withdrawn. This was in the direction of the frontal portion of the middle lobe of the brain. This fluid was examined by Dr. Bulig and was believed by him to be cerebrospinal fluid, and without any evidence of infection. The bony flap and the scalp were now returned to their places and closed without drainage.

The patient vomited two or three times after returning to his room, and the last time he called for a basin. This was the first time he had asked a question or demanded anything since he came to the hospital four weeks previously. During the afternoon he asked for water and conversed with his nurse and his father. He had a much more human expression upon his face, and when he answered questions he gave extended answers which involved considerable thought. His father told him that he had moved to Henry, and he replied that he told him last week he was going to do so. His father asked him if he knew what house he had bought, and he said, "Why, yes, of course.

You told me when you were here the last time that you had bought the Gregory house."

When I visited him in the evening he told me that he was feeling quite well, but that the side of his head was a little sore, and that it hurt him to bend his head on his neck. He told me that he was not dizzy to amount to anything, and that he would like to sit up on the side of the bed. When we brought him to an erect position he said that he was dizzy and volunteered this information and asked to be allowed to lie down again. His pulse was 114, his temperature 99°, and his respiration slow. He had a trifling cough and expectorated with some distress on account of the pain in his neck.

The first night after the operation he slept perfectly well, and was relieved of the mucus in his stomach and intestines, and became hungry. He asked without suggestion for something solid to eat, and had a long conversation with his nurse and his father. A good many nurses and doctors called on him during the day and he spoke to each of them pleasantly. He talked for a half hour with his interne, Dr. Hall, and described his father's farms and gave their value and what was raised on them. On the evening of this day his temperature rose to 101°, but fell again without any medical treatment.

On the morning of the second day he was just as bright as ever, and his head was dressed, and it was found dry and apparently united, except where the drain from the mastoid protruded in the neck. Dr. Pusey examined his fundi and found them in the same condition as before the operation. He demonstrated the potency of every muscle of both eyes, and the normal reaction of the pupil.

Immediately following the operation the patient made great improvement in his appearance and his interest in the outside world. At no time after the operation, either in the hospital or since he returned home, has he had involuntary discharges from the bowels or from the bladder, and he has been perfectly tidy. He went with his nurse to the theatre two weeks after the operation, paid the street car fare, and conducted himself properly. He seemed to enjoy the performance and expressed himself vivaciously and rationally at all times. He returned to his home on March 30. At that time there was only slight improvement in the appearance of the retina, but the Babinski had entirely disappeared.

After returning home the improvement continued and the patient was able to meet all the requirements of his home life, taking good care of himself and his room, and doing chores about the house. He complained of weakness in his leg, and on measurement the calves were found distinctly smaller and softer than they ought to be for a boy of his size. On leaving the hospital he weighed 119½ pounds, having gained almost exactly 20 pounds since the operation. He has made a further gain of 15 pounds, and has maintained a steady weight above 135 for more than three months. On December 1 he weighed 160 pounds in light shoes and without overcoat.

There has been a distinct improvement in the expression of his face, and he has shown renewed interest in the newspaper, especially the sporting pages, in romantic literature, and in substantial history, which was formerly his great delight.

During the past summer he has suffered consecutively the loss by suppuration six of his toe

nails, beginning with the right big toe, and this in spite of superior surgical precautionary treatment.

This was either a case of dementia præcox or it was not. If it was of this nature then we are warranted in assuming that the hysterical symptoms which disappeared so promptly on suggestion, namely, the forcible closure of the eyes, the mutism, the persistent vomiting, and the refusal to take food, were of a more superficial nature than the remarkably general anesthesia which remained in spite of suggestion. There must, moreover, have been some serious condition which prevented the patient from gaining weight previous to the operation, which was in some manner removed by that procedure. Again, his constant untidiness before the operation and his habitude disappeared promptly after his recovery from the anesthetic. It is my opinion that the amount of fluid removed from the cavity, natural or unnatural, was insufficient to produce compression. Moreover, there was no evidence of compression when the dura was exposed.

The possibility of a tuberculous chronic meningitis which was jogged out of place by the operation is not supported by the frequent tuberculin tests, by the condition of the fluid withdrawn from the center of the frontal lobe, or by the condition of the leucocytosis.

The subsequent history of this patient will be of great interest, and if it is a fact that dementia præcox is an absolutely progressive, destructive disease, with an invariable tendency to extreme dementia, then time will complete the diagnosis. In the present state of our knowledge of the etiology of this disease, no further tests or evidence can be expected.

Since the patient is now in a perfectly rational conversational condition, it would be interesting to see what the Freud and Jung psychoanalysis would show.

108 NORTH STATE STREET.

WHY NOT TREAT THE INSANE LIKE OTHER PATIENTS?

"DESERTS INSANE PATIENT.—Ordered transferred from the hospital for the insane at Elgin to the home for feeble-minded at Lincoln, Roy F. Crow, committed from Kane County, was deserted in a Chicago hotel by an intoxicated deputy sheriff, in whose charge he had been placed in making the trip from Elgin to Lincoln, it was reported yesterday to the board of administration. The order was given into the hands of the sheriff of Kane County, and he in turn sent Charles German, deputy, to take Crow from Elgin to Lincoln."

THIS clipping from the *Chicago Record-Herald* of January 12, 1912, is illustrative of the utterly irrational method of treating the insane after commitment. Only a few months ago a group of insane men were transferred from one institution to another. Two deputy sheriffs, officers of the court, took them in charge, and got them safely to the metropolis, where a change of cars was necessary. Here the deputies became so completely intoxicated that they sub-deputized one of the insane patients to take the others to the madhouse, while they remained in the city to finish the carousal.

It was only a few years ago that the police of Chicago were as omnipotent and legally as omniscient as the county judges and the sheriffs are now. Patients

with gunshot wounds, fractures of the vault and base, uremic delirium, delirium tremens and typhoid delirium picked up on the streets were put in the cells of the police stations, and there the sufferers were left to live or die as they might, without the services of physician or the rites of clergy. Now every police station is provided with a physician, and the atrocities and scandals of the previous decade are unknown.

There should be a sanitary constabulary in every civilized State. The education, training and customs of the sheriffs and their posses of murder and robber hunters is not adapted to fit them for the care of the insane. The number of insane persons is now sufficient (1-400) to demand such a sanitary constabulary. These official men and women should be trained in the institutions of the insane to a professional *esprit de corps*, and the service should be a part of the circuit of service through which the higher executive and administrative officers of the State charities should be filled.

There is probably no people so excessively alert to personal abuse of a citizen by an officer as the American, but of all people he is the dumbest to recognize radical defects in his political machinery and the slowest to rectify them. Although the State now confines in its madhouses one out of every five hundred of its citizens in a hopeless custody, it makes absolutely no effort to determine the physical basis of the insanities and no efforts are made in the State hospitals "to cure." The patient is brought to "the hospital" under commit-

ment by the sheriff or his deputy, and there he stays ten years on the average until he dies.

In Porto Rico there has existed for several centuries a race of Spaniards of the most shiftless and lazy sort. It is evident to any one who will read the subject and observe the present conditions of the same race, that they were a sick people all the time, harboring a parasite rather than a vicious ancestry or a twisted idea. If they were lazy, lascivious and vicious it was because they were intoxicated. The hookworm, the unknown, but well-understood organisms that produce yellow fever, smallpox and measles and the trypanosom of the sleeping sickness, have displaced the flimsy theories of these conditions previously promulgated with all seriousness. It was not the courts or the sheriffs that banished a disease from the environs of the Carribean Sea that was the terror of Europe and America for three centuries, but a sanitary constabulary beginning with fifty officers and a regiment of assistants and armed with no weapon except a cane and an oil can.

The irrational commitment of the insane by a court (criminal or civil) after ten days' detention of the patient in a prison, without residential medical attendance and the conveyance of the committed or sentenced sick one to a hospital which disavows any pretention of curing what is freely admitted to be a condition if not a disease of unknown origin, by an officer of the court, whose principal duties are to arrest, confine and

conduct murderers and thieves, is not only a blot on our boasted civilization, but a bar to all betterment.

It is a short-sighted attitude of our professional organizations that their time is given to the trades-union view of their function, to the demand for a department of health, for which the medical trade-unionists are so vociferously blatant, to the pursuit of quacks and newspaper advertisers, from the ranks of whom too many of our official leaders have arrived with the burden of their previous ethics, and that these same organizations have no time, place, space or effort for bettering of conditions, grown up by the irrational assumption of the judiciary to meddle with or control of distinctly medical affairs, into scandalous conditions of custody without research, and commitment and transportation without decency.

But there is always hope at the bottom. The organization of the American Medical Association was not so bureaucratic as to prevent spontaneous "scientific" activity within the branches. This was left to the control of the medical ward-healers. In one of the metropolitan branches of several thousand voiceless members voted by an electorate of seventeen counselors, there is a ward society which is allowed to meet for the reading of papers, provided no expense to the parent society is incurred. This sub-society has undertaken, so rumor has it, a three-day session to discuss the subject of insanity, and the meetings are to be held in a great hotel with dignified surroundings. Let us hope that these meetings will be open and ungagged,

and that at least one day will be given to the treatment of insanity by the Christian Scientists, the Emmanu-
elists and the Psychoanalysts, and that two days at
least be allowed that system of thought, reasoning and
experiment which has been rewarded by the elimina-
tion of cerebro-spinal meningitis, syphilis and its de-
pendents, yellow fever, diphtheria, cholera and small-
pox; and many of the lesser ills, from the occult.

GLYCOSURIA AND ACAPNIA.

THERE are three periods of life in which three distinct types of diabetes are prone to appear. The first is in infancy (1-10), the second in adolescence (19-25), and the third is at the end of maturity (45 on). The prognosis is grave in the two earlier periods, but not so unfavorable in the last. Nevertheless, the appearance of sugar in the urine has always been looked upon as seriously portentous.

Too great gravity must not, however, be thoughtlessly given the appearance of glycosuria, but it must be interpreted by its etiology and its accompaniments.

Glycosuria follows the administration of many drugs; for example, curare, morphine, strychnine, amyl nitrite and phloridzin. It attends many general anesthetics—ether, chloroform and nitrous oxide. It follows partial asphyxiation by carbon monoxide and illuminating gas. It is brought on by inhaling an atmosphere containing more than 13 per cent. of carbon dioxide, regardless of an abundance of oxygen. It follows great nervous excitement and emotion. It is a symptom of senility of tissue. It is produced in animals by temporarily ligating the abdominal aorta. Stimulating the pancreas and liver by painting their surfaces with adrenalin leads to glycosuria, but the most intense and severe glycosuria follows the extirpation of the pancreas.

Mechanically, glycosuria appears as a result, on the one hand, of a defect in the normal restraining power of the epithelium of the kidney to the passage of sugar, or, on the other hand, it is due to an increase in the amount of sugar in the blood; that is, to a hyperglycemia. Practically all the glycosurias except that produced by phloridzin, are due to hyperglycemia.

Sugar is carried in the blood entirely by its plasma. The corpuscles themselves show scarcely a trace of glucose. The sugar is not in solution, but is held in a feeble chemical union with the proteins of the serum.

It is possible to produce glycosuria in the perfectly normal individual by the administration of phloridzin. This glycosuria may be continued for a long time without producing any symptom, providing the patient is sustained by a liberal diet. The sugar does not come from the trifling amount of the phloridzin administered, and there is no increase in the amount of sugar in the blood, as careful chemical estimations have repeatedly shown.

The appearance of glycosuria after prolonged, and even *during* brief, general anesthesia, has attracted much attention among clinical surgeons. It has often been noticed that strong men who are moderate drinkers suffer most regularly from glycosuria as the result of ether anesthesia. The explanations of this phenomena have been varied and fantastic. It is clear, however, from the very positive demonstrations of Edie, Moore and Roaf that the glycosuria is not due to a deficiency of oxygen. These cunning investigators kept animals for forty hours in an atmosphere containing only 5 or 6 per cent. of oxygen, but en-

tirely free from CO_2 , without arousing the slightest trace of glycosuria in the quiet animal. Struggling animals show a marked glycosuria, while those that take an anesthetic quietly present no glycosuria, either during or after the anesthetic. The sugar often appears in the urine within five minutes after the anesthetic has begun, and before there is any evidence of asphyxia.

Henderson and Underhill considered the glycosuria due to a hyperglycemia, which is produced by the changes in the tissues of the body as a result of acapnia. The acapnia is produced by the hyperpnoea—the over aeration of the blood—which results from the struggles of the subject before the anesthetic has had time to produce quiet. The hyperglycemia is then due, not to an increase in the production of glucose, but to a closure of the ordinary outlets to this product into the muscles and other tissues of the body. The ability of the body to take up glucose from the blood is diminished by the edema of these tissues, which invariably results from a diminution below the normal in the amount of CO_2 in the blood.

The appearance of sugar in the urine as the result of great emotion is explained by these authors in the same manner. Struggling cats display not only polyuria, but glycosuria in a most incredibly short time, and human emotion is proverbially followed both by polyuria and glycosuria. The result of increased ventilation of the lung beyond the needs of the tissues produces acapnia. If the CO_2 content of the blood is reduced in any manner one-half or more, respiration ceases, and will never begin again until the respiratory center is excited by an increase in the carbon di-

oxide. There seems to be more danger, then, of reducing the CO_2 in the blood than increasing it, and Edie, Moore and Roaf have shown that this increase in the blood may be safely advanced even to 14 per cent. of carbon dioxide, provided that the amount of oxygen in the inspired air is kept high enough. Hill and Flack have shown that the respirations are stimulated by an increase in the carbon dioxide up to 30 per cent. in the air breathed.

Glycosuria is not the only following of acapnia. A toxic condition attends acapnia, which is recognized in many patients by the appearance of acetone in the urine or in the breath. Acetone is in itself a further stimulant to respiration and perpetuates or accelerates the condition which initiates the acetonemia. Thus begins a so-called vicious circle. In diabetic coma, this peculiar situation is met. The rapid breathing eventuates an acetonemia and acetonuria. Acetone, moreover, produces glycosuria. The nervousness of diabetics is in some way related to the appearance of acetone in the blood, and so also is the hyperpnea.

A degree of acapnia more intense than that found under any other condition was observed by Levy in a young girl who was dying of diabetic coma. The blood contained only 3.3 per cent. of carbon dioxide gas.

There is no way of measuring or estimating an acapnia except by a careful determination of CO_2 in the blood. In order to determine the cause of death from anesthesia this determination should be made according to the most technical chemical methods. It may be that in the future some clinical method will supersede the laborious laboratory investigations or a

happier elimination of the need of such investigations may develop by the perfection of our technique in the administration of general anesthetics.

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THE PREPARATION OF THE STUDENT TO BEGIN THE STUDY OF MEDICINE.

IF the practice of medicine in the United States is ever to be restored to a professional basis, and it may be reasonably contended that it never will be, one of the primary changes will doubtless appear in the preparation of the student for his medical studies.

The late Richard T. Crane, of Chicago, the man of action, rich as he was and original as he has shown himself in his last testament, will probably be longest remembered because of his astounding irreverence for the current college education. His utterances on the subject were unmistakable and numerous, but strangely enough he failed to present acceptable and adequate evidence upon which his judgment was formed or any convincing argument to sustain his position. Doubtless this omission was due to his own lack of scholastic training.

It has been the fashion for years to disparage the public schools because they were cheap, because they were godless, because they were conducted without common sense, because they stunted the intellect and

quenched curiosity, because they strangled originality and spontaneity, because they crippled self-reliance and fatally wounded all integrity, because they were under political influence and because they were petticoat-ruled. But from this defamation the college has been held sacred.

It has been pointed out, however, in our previous editorial, that the college professors were greatly dissatisfied with the result of their own entrance examinations, even after they had labored for years to systematize and standardize them.

In a recent number of the *Nation* an undergraduate tries to show why few superior classmen elect teaching as their profession, and contends that only men of the lowest grades of intellect could afford to take the Ph.D. degree, which is a prerequisite on the long road to an underpaid professorship.

In looking over lists of old acquaintances among college boys in several neighboring institutions, little but disappointment has resulted at the apparent fruitlessness of their scholarship. By their teachers this disappointment has been set down to sheer neglect of opportunity or wilful dissipation of energy. However, the fact remains that at the competitive examination for positions in the public service and in the more convincing evidences of remunerative literature, in the political forum, in the marts of trade, and even in the camps of the manufacturers, our graduated college boys have not held and do not hold the positions of dominancy and prepotency which we had

predicted for them and which we believed we had a right to expect from their prominence in their student days. We had known these men too well and too intimately to believe that their positions of mediocrity were due to lack of the fundamental qualities of heredity, good breeding and good health, and we have discovered that they are not in the ordinary sense dissipated or degenerated; but we believe that they are woefully deficient in inspiration, motive and vision, in the modesty of self-reliance and the devotion of high purpose; and they were unable to use, in the struggles of life and the march of civilization, the scholarship for which we had supposed the college stood.

Naturally, then, we have looked to the college for an explanation of the phenomenon which seems to have been the basis of the prejudice of the great captain of industry.

It is certainly a fact that the modern college has scant enthusiasm for that scholarship for which alone we had supposed that it was established. It is, moreover, an undisputed fact that the modern college has developed an inordinate enthusiasm for gymnastic contests, a perversion of athletics and physical culture, that their founders had never thought of as a part of the institution. All the enthusiasm and all the *esprit de corps* of American college life centers around if it does not center in the competitive athletic field. At all our public gatherings, ceremonies or festivals there are no such crowds and no such gate receipts as at the annual football meets of the great universities,

unless, perchance, it be the extra legal istic contests at Goldfield and Reno. The prominence of an undergraduate both among his fellows and before the alumni and faculty depends rather upon his gridiron than upon his classroom record, more upon his toe than his head. One would be quite unsafe in any of the fraternity smokers or *kneipes* which constitute the social primaries of college public opinion, in presuming that superior intellectual potency or scholastic achievement secure to a student the commendation and approbation of his fellows. It is, on the contrary, almost disastrous to a student to receive public praise from a professor for the surpassing excellence of his work. He is at once dubbed a "grind" or a "boot-lick;" yet a good kick or a good run with the pigskin will call out gladiatorial applause and fulsome and unending adulation in the student and in the public press.

When we mention college athletics, we do not mean the perfectly legitimate hygienic gymnastics which ought to guide the physical development of the youth, nor their spontaneous sports on turf and field, which all healthy boys rush into when let out of the classroom or study, but rather the intercollegiate meets for which there is so much preparation and secret training of the teams that are often collected by ways that are dark and tricks that are not nice, from the preparatory schools far and near. To the student, however, the athletics are these much advertised and highly featured contests and all that goes with and after them. The team is the center of college interest, prophecy,

speculation, anecdote, squib, in campus and fraternity talk, and in the student press, all interest centers about "the squad" and its members.

If it were a matter of the student body alone perhaps it would be both foolish and useless for us "dead ones" to consider these contests seriously, but it is a matter in which the college and university have taken a hand, both through the alumni and through the scholastic senate. The colleges have formed an inter-collegiate Hague-like tribunal, which legislates, adjudicates, convicts and punishes.

Judged by the artificial system of ethics which the ill-timed alliance between the dignified faculty and the football squad has contrived, there are two heinous and unpardonable sins. On the part of the institution it is a crime to pay a football player or other athlete a cash salary for his services in the field. On the part of a player it is a fault of excommunicable gravity to have in the remote and distant past played a game of ball for money by the day, week or month, or for a percentage of the gate receipts or all of these, either on week days or Sundays, shod or barefoot, at home or abroad. But there are rumors that the football and other teams have a free training table, free rooms in the best halls, free outfits as often as necessary, and even trunks, linen and dress suits from the athletic haberdasher. Of course, we don't believe any of these things, nor do we believe that tutors are furnished to pony stupid centers or nimble ends for the ever-necessary examination in the classes of finical professors who do not sufficiently appreciate "sport"

to mark up the members of the team. Never has the Hague-like tribunal punished any college or university for such indirect remuneration of players.

The attention of the tribunal has often enough been called to the early indiscretions of players. After the alumni and other college men have gotten together a suitable aggregation to promise a winning team, some envious adversary collects affidavits and other evidence that a particular player, when a boy of ten or fifteen, was first base on the Mojunk Tigers, and on August 21, being Sunday afternoon, did on Sullivan's field, play against the Hibernian Harpers, and the same day receive a portion of the gate receipts of that game, the same being \$6.35, receipt for which in his own sign manual accompanies the evidence in Appendix A. This material is presented to the tribunal just before some important game, and the player is ruled out and the game thereby lost to the unfortunate and defeated university.

There is another factor which is a large increment in modern college life, in the establishment of athletic hero worship. The daily newspapers are quick to feature any idea that is held by any group of its readers. The sporting editors have sub-editors or contributors in every college or university, and the various "heroes" are "featured" in the big Sunday editions. Their life-sized portraits and more than life-sized romances and pseudo-scientific bodily measurements fascinate the hero-worshipping youths. The adventures of traveling football teams are cabled from Europe, Asia and the islands of the sea as fully as the exploits of the Em-

peror of India at the Durbar, and they are read with greater interest and relish.

It is a fact we must admit that scholarship withstands featuring in the modern fashion very poorly, and it is also a fact that scholarship of any sort has few fans.

If we except competitive team athletics, faculties seem to shun contact with modern life. The ladies of the faculty frequently have social aspirations in which their husbands furnish the cue. The members of the faculty, however, who seriously mix with public affairs, lose caste, and at last place. The active members of any faculty disturb the dignity and complacency of the procession.

The effect of college life on the student comes from two quite distinct sources. The spirit, vision or motive of the school is the most important, immeasurable, intangible and almost indescribable, but it is the most certain and permanent result of school life. At Williams College in 1806 it was the *Mission Band* that crystallized this vision. At Oberlin half a century later it was the *Abolition Club*. Such soul-inspiring crazes are not smiled upon now. Anything of the sort disturbs the scholastic quiet and contemplative complacency of the faculty. If a professor goes into the sweatshop or investigates the lodging-house life, or writes a sensational novel, or preaches an honest sermon, or does any other shocking thing, he finds a cool reception at the scholastic clubs and few doors are open to his preferment. Even the women of the faculty take part in his segregation, using for the pur-

pose their own feminine but marvelously effective methods.

But our interest as medical men is alert to the training of the incoming student body in our rapidly developing medical schools. On the attainments and ideals of these men all our hopes of professional betterment depend.

The training of the modern college rarely furnishes those attainments most necessary to and desirable for the making of a medical man. The medical probationer should, above all things, have a commanding knowledge of English. By this I mean that he should be so trained and brought up that there remains the minimum amount of friction and retardation between the idea conceived in his mind and the spoken or written word to express it, and between the spoken word as he hears it or the printed page as he reads it and the argument or image that is thus set forth in his mind. More than this, the student's knowledge of English literature and Anglo-American history would show a comprehensive and discerning judgment of taste, style and culture. The prospective medical student should be a cultured young man.

As a part of the English education, the student should also possess a fundamental and usable equipment in mathematics.

Arithmetic, algebra, geometry, analytical geometry, the differential and integral calculus should be like the English vocabulary and the multiplication table, attainments to be used as tools in his subsequent studies. When he begins the study of medicine he should, like

the engineer, carry not only a watch, but the slide rule and the metric measure in his pocket and have the protractor, the divider and the square on his study table.

It is fortunate that the literature of medicine is no longer in Latin and Greek, but unfortunate that it is scattered through several languages. The modern American medical student can not well forego a reading knowledge of French and German; it is well if he adds Italian and Latin. This knowledge should be exact enough for him to carry on his studies in anatomy, physiology and chemistry, with textbooks and laboratory manuals in any one of these languages, or in all of them simultaneously. Unless these branches are studied in the three great languages of science the subsequent clinical researches, which every first-class modern physician must depend upon in his daily work, will be too laborious and imperfect to be fully effective. We can have no argument with one who says that all the necessary medical literature is translated into English.

In each successive stage of culture, the student comes to the beginning of his preparation for a professional career, equipped almost unconsciously with different attainments characteristic of the time.

Probably our young men to-day differ from those of a generation ago most markedly in their mastery over the problems of physics. Not only do our boys run the bicycle and the explosive engine better than we can, but they play with dynamos before they have entered their teens and communicate with one an-

other by wireless telegraphy, which still remains to us something of a mystery. It is not presumptuous on our part to require of the prospective student both a practical and theoretical knowledge of the physical sciences which would have been impossible in 1895. A prospective medical student of to-day ought to have no trouble at all with the problems of mechanics or hydraulics. They should be like the multiplication table to him, laboriously learned and unconsciously used—just tools in his intellectual workshop. Electricity, optics and acoustics are related domains in physics which the student should be familiar with as we were with the pen, pencil and the typewriter. He should have a perfectly usable knowledge of the units of electricity and be ready in electro-dynamic measurements. He should be thoroughly familiar with the mathematics of electricity and optics, and understand mathematically reflection, refraction and diffraction. Such requirements might seem to some of us older fellows as exacting, but they are naturally acquired by our young men as we acquired the ability to use the footrule, the weights for measuring gravity and the surveyor's chain and compass.

Chemistry as a part of physics must be a definite part of the subconscious attainment of the medical novice. It is a pure science in its theory, and is easily acquired and retained. As an art it is a technical one which demands early (youthful) and skillful exercise. The *amount* of the science is easily fixed and measured by examinations, but the *faculty* or technique in the art should be judged by its thoroughness

and tidiness, rather than by its extent. Habits are more than achievements in this technical art.

The equipment of the modern medical student should include a theoretical knowledge of biology and embryology and a practical understanding of some branch of biology which must embrace the art of dissection and the art of microscopy. These are two important technical attainments that must be presented by the student in a form not far short of military exactness. Like English, mathematics and physics, they are youthful attainments, and can rarely be cultivated or acquired after adolescence.

There is another modern instrument of precision in the use of which every prospective medical student should be theoretically and practically trained. That new instrument is the modern library. The art of its use is a branch of bibliography. It is as necessary for the modern medical student to use automatically and without friction the modern library, and the modern methods of finding scientific material in books, as it is for him to use his watch, his slide rule, his thermometer, his scales and his burette. The medical education of the present and future requires all these technical attainments, and among them bibliography is not the least permanently useful.

The preceding attainments required for the medical students are so much dead and motionless machinery, necessary, to be sure, but capable of becoming little more than an intellectual junk. *The motive power of the coming medical man must be his scientific imagination, his vision and his devotion.* These

elements are the unconscious inspiration of surroundings and circumstances. Every student before beginning the study of medicine should be thoroughly familiar with the history of the advance of science. So far as I know, there is no course in any university or college which exactly meets the needs of students who would enter medicine with the idea of advancing medical science. The great acceleration in human knowledge and the advancing conquest of human wit over nature and disease have come without much conscious training for this express purpose. The discovery of fire, of the metals, of the use of gunpowder, of steam and of electricity was all accidental. The acquisition of writing, printing and photography was merely painful labor, incident to necessary struggles or fantastic effort. The use of numbers, the conceptions of geometry, algebra, logarithms and the calculus, with their many applications in trigonometry and navigation have been rarely the result of conscious effort to a definite end. And, if we come nearer home, we find that only in extremely recent times have the purposes of research been logically antecedent to the most inestimable results. The history of microscopy, bacteriology and aseptic surgery, hemolysis, immunity and systemic sterilization only suggest the possibilities of well-directed effort in systematic research based upon rational theoretic propositions. Most of the men of our day have read Taylor, Guizot, Buckle, Green, Draper, Taine, Eggleston and White, but how few of us have studied the life and labor of such heroes of the past as Kepler, Galileo, Hadley, Richard

Norwood, John Harrison and a multitude who would be in an ecstasy could they have the vision of navigation which is the unearned heritage of every school-boy to-day. In our own more intimate field, how little have we regarded the labors of Robert Boyle, Lavoisier, Boerhaave, Newton, John Dalton, Ampere, Berzelius, and all those heroes of science down to our own contemporaries who have taken away from alchemy and mystery the great territory of physics and chemistry, and John Hunter, Jenner, Sydenham, Pasteur, Lister, Koch, Loeffler, Bordet, Ehrlich, Loos, Stiles, Ashford, Charles Finley, Lozier and Manson, with all those many co-workers who perhaps have contributed equally to the dissipation of the occult and mystical from the pestilence and the scourges of man and have opened up to human life and adventure and to the world of commerce and civilization that most prolific zone which has been shut off by the intangible terrors of the tropics. It is not too much to ask that the prospective medical student should have consciously pursued the study of the history of these great warriors of science and definitely and psychologically considered their plans, their motives and their methods.

The code of ethics of the American Medical Association has been placed upon the shelf as a dead letter, and there it lies beside the Hippocratic oath. Nevertheless, the prospective medical student should receive very systematic training in the obligations which he incurs and the emoluments which he should earn upon entering the medical profession. He should not

compete with the pawnbroker, the banker or the financial prestidigitateur. He should look upon his occupation as entitled to honor, to compensation, and to such leisure as is necessary for the best prosecution of his work. He should be taught to despise the hustler, the busybody, no matter on what plane he practices, be it the street corner, the coursing auto-dispensary or the columns of a subsidized press.

THE FAMILY SUBSTANCE AND COINCIDENT SICKNESSES OF BLOOD RELATIONS.

"The trend toward mysticism in our time is marked. It appears in the field of the intellect; in religion; and in art. Professor Harold Höffding, of Copenhagen, declared in a recent congress of psychologists that since all the most important problems are beyond the reach of man's reasoning power, a search for ultimate reality leads inevitably to mysticism. Henry Bergson, the French Jewish philosopher, whose speculations have deeply influenced the whole thought atmosphere of the day, shows decided mystical leanings. 'Symbolism' is the keynote of modern drama; the watchword of Ibsen, Hauptmann and Maeterlinck; and symbolism, we are often told, is only another name for mysticism."—*Current Literature*.

In spite of its pervasiveness, very few persons can define mysticism. There is a mystical tradition extending for many centuries back to Egyptian civilization, through Clement of Alexandria, St. Basil, St. Bernard of Clairvaux, Bonaventure, St. Francis of Assisi, Thomas à Kempis, St. Catherine, Fenélon, Mme. Guyon, Henry More, George Fox, Sigmund

Freud, Wilhelm Fliess, and a great army of pseudo-scientists, known only to their own several cults. J. Ellis McTaggart, in the *New Quarterly*, London gives a very comprehensive definition of mysticism:

"It seems to me that the essential characteristics of mysticism are two in number. In the first place it is essential to mysticism that it assert *a greater unity in the universe than that which is recognized in ordinary experience or in science*. However apart this unity is, how far it excludes differentiations, are questions which would be answered differently by different mystics. What is essential is the affirmation of a unity greater than that which is usually acknowledged. The second essential characteristic of mysticism is the affirmation that it is possible *to be conscious of this unity in some manner which brings the knower into closer and more direct relation with what is known, than can be done in ordinary discursive thought*."

We are all familiar with the comprehensive, but to some of us incomprehensible theory of Sigmund Freud, and with the extensions which his theory has received at the hands of his multiplying admirers, both in Germany and in America. It is a distinctly mystical theory, insusceptible of either proof or refutation. It includes many excursions into the intangible and the occult, especially in the direction of dreams and erotic psychology. Those who are able to read Freud's theories and the numerous illustrations which he puts forth as confirmatory of them without suffering an attack of mental indigestion or an intellectual crisis, may perhaps be able to read the theory of *the family substance* which was put forth by Wilhelm Fliess, in

1906, in a beautiful volume entitled "Der Ablauf des Lebens, Grundlagung zur exakten Biologie" (Franz Deuticke, Leipzig). This book contains eight pages of assumptions, 584 pages of illustrations of these assumptions, somewhat after the manner of Freud. It is the most remarkable, mystical, mathematical and biological compilation of modern times, and resembles the symbolic mysteries of Egyptian mathematics and Egyptian medicine.

It appears that Fliess discovered that women menstruate regularly once in twenty-eight days, and that many of them have irregular menstruations which can be easily made to correspond with nodes produced by the coincident, aggregated or interfering rythms of twenty-eight and twenty-three days. He takes as an illustration Fräulein H., who menstruated on March 22, 1896, and following that at intervals of 23, 21, 26, 24, 21, 25, 16, 16, 13 and 22 days, the last time upon October 15 of the same year. Now the normal interval of menstruation is twenty-eight days, but it is not once apparent in this sequence. If, however, we take the six periods beginning with April 14 and ending with October 15, and omit considering the other menstruations, we have the following series: 23, 47, 24, 46, 45, 22, which are equal to the following series respectively: 1×23 , $(2 \times 23) + 1$, $(1 \times 23) + 1$, $(2 \times 23) - 1$, $(1 \times 23) - 1$. If we make a sum of the six coefficients of the factor 23, we find that we have 9×23 . In these seven terms then we have a distinct interval of twenty-three days, with a possible error of

a plus or minus 1. Now, taking the remaining terms, May 5 to August 25—which is equal to 112 days, or 4×28 days—and the terms between July 15 and September 10—which is 57 days, equal to 2×28 days + 1—we see then that in the exceptional menstruations which rendered the whole series irregular and caused it to apparently depart very strongly from the regular menstrual period of twenty-eight days, that these four intervals exceed the regular interval by only one day.

From such a system of examining irregular menstruations, Fliess comes to the conclusion that there is in each individual a family substance having a male and a female manifestation, the rhythm of the former being 23 days from node to node, while that of the latter is 28 days. He shows further that the eruption of the teeth in the children of a family, the appearance of menstruation in the girls, and the various sicknesses of both the boys and girls stand in a remarkable coincidence to the menstruation of the mother!

The period of gestation is shown by Fliess to be a multiple of 28 and 23 and furthermore that the appearance of the next pregnancy and the next gestation and the next birth corresponds similarly with these mystic numbers. In this manner he follows out the complete history of Sigmund Freud's family and that of many of the most celebrated and best known characters in Europe. He gives an illustration of an epileptic who had his epileptic attacks beginning after an interval of

571 X 28 days after birth and occurring subsequently at intervals readily measured by 28 and 23 days. In further examples he shows that measles, pneumonia, scarlet fever, and many other infections appear at intervals, measured by these mystic numbers.

Perhaps one of the most remarkable examples (Ex. 34), is that of Herr Ecke, who was born on November 26, 1834, and on January 27, 1891, had a first attack of gout. From that time on he had nine attacks of migraine and then an epileptiform attack. At last, on November 15, 1896, he had an attack of hemiplegia with aphasia, and died on March 11, 1897. It takes twenty-five pages of complicated mathematical formulæ to show that these events, which occurred at the latter end of a life of 22,751 days, are commensurate with the mystical numbers of 23 and 28, and that each event occurred at one of the nodes which disturbed the family substance.

In the examples 35, *et seq.*, he gives illustrations of the coincident diseases of several members of the same family and from these examples illustrates his theory of family substance. The most striking one is that of the Fliess family, where he naturally has had the best opportunity of making observations. The 125 or 130 pages devoted to his demonstration appeal largely on account of their mass and on account of the introduction of numerous functions represented by letters of the Greek alphabet, and by complicated formulæ.

Fliess also takes great bulks of statistics of still-

births and of twins and of triplets, and reduces them to conformity with the mystical numbers 28 and 23.

In order to facilitate the explanations of facts by his theory, he has added a series of formulæ and tables occupying ten pages, so that researches may be made without adding, subtracting, multiplying or dividing or using the slide rule.

Arnold Siegmund, in the last number of the *Annalen der Naturphilosophie*, has devoted a large amount of space and a great redundancy of illustrations to demonstrating the simultaneous sickness of blood relations. His observations are in support of Fliess's theory of the family substance. It is hardly worth while to give more than a few of his notions. When, as a laryngologist, he is called to see a sick child at her grandmother's house, he is obliged, after making a diagnosis of laryngitis, in order to treat the child properly, to discover the condition of the family substance by telephoning to the mother, to the office of the father, and to the school where the brothers are in attendance, and treating each of them. If he prescribes for a child's hives, the castor oil must be given not only to the infant but to the father, the mother, the sisters, the brothers, the uncles and the aunts. If the father and mother are traveling and one of them is attacked with colic, he would freely use the telegraph and telephone to discover the condition of the children at home. In other words, it is necessary to treat the *family substance* wherever it is located, whenever one member of the family is discovered to be ill! The multitude of his

illustrations seem to conform to his method of thought, although to those who hold to a materialistic philosophy, there is no more reason in the sequence of his words than there is in the effusions of a maniac.

Fliess replies to his scanty critics at great length (*Annalen der Naturphilosophie*, Vol. X, pp. 314-350), and closes with the following significant words:

"My researches have had a singular fate.

"In them life is shown for the first time as a function of our planet and as rhythmical with its two great periods, the time of revolution, the day, and the time of rotation, the year. These functions were demonstrated specifically and generically in a great number of the most various organisms. New lights fell thereby upon the existence of the two sexes, upon bilateral symmetry, upon procreation and growth, upon birth and death. Problems of the very first order were touched upon and connections revealed themselves to our eyes, where previously misconceived isolation existed. Periodical rhythms flashed simultaneously through the entire body of a generation, and on the day of death of the ancestress the procreative ripeness of new life showed itself budding. Surely all are questions well worth the labor of the most noble. But in the literature no echo was forthcoming, and with the exception of the editor of these *Annals*, university professors of high rank have not expressed themselves and the few other representatives of science who have spoken repeated only (with what right the readers will have to determine for themselves) one and the same objection, namely: 'The author was toying with figures and is unacquainted with the most simple principles of arithmetic.' The youngest critics considered themselves qualified in ignoring all the material

brought forward by the author from the entire range of biology and the author's own medical experience of more than thirty years' activity. And why? Because the researches, as one of the critics says, are of a simplicity at first quite shocking. These researches came forth from no laboratory; they were discovered without Roentgen rays, radium emanations, or ultra-microscopy. They were brought forth without aniline colors and without hemolytic or serum reactions. They were the product of human genius."

One who has devoted his life to doing things for their immediate, rational, mechanical necessity, is poorly fitted to describe or combat a mysticism, an occultism, a fakirism which is the modern manifestation of the wonder of the primeval soul. Our modern business life is rife with mysticism. Our great financial gamblers consult, as our illegal gamblers always have done, the fortune teller and the clairvoyant. Books are not only published, but bought and sold on the mystic road to financial success, *e. g.*, "Thought Force in Business and Every-Day Life;" "The Magic Seven;" "Self-Reliance;" "The Sixth Sense;" etc.

The recent rush of psychiatrists into the mysticism of Freud has no parallel in human history. Medicine and mathematics among the Egyptians and Pythagorean Greeks were distinctly mystical, and medicine retained many mystical theories and practices until near the close of the nineteenth century. Most of the mysticism in medicine and religion, too, had disappeared in the light of modern science by the beginning of the last quarter of the past century.

About the time of the World's Fair in Chicago the fetishism of modern materialistic civilization began to show itself in various ways, in literature, poetry, drama, art, music and at last in the philosophy of the time. At a much later period mysticism entered medicine and, as one might almost predict, a close companion of a new philosophy of its old erotic associate, sexual lust. Now the mysticism of medicine in its most conservative forms joins sexual psychopathy, the symbolism of dreams and the psychogenetic origin of pathologic morphology, as well as pathologic physiology, in one mass which can be comprehended by no reason, combated by no argument, and influenced by no prayers.

Since the dawn of history, the dream has been a conspicuous property of the soothsayer and the fortune teller, and now the symbolism of dreams is the left bower of the Freudean cult. Modern literature is flooded with "dream books," and it is difficult to draw the line between those of the Freudean and the other sects.

When we recollect that Pythagoras was, or at least his followers were, in a primeval sense, enthusiasts of a mystical mathematics in which the vaguest symbolism was wedded with the most irrefutable science, we need not wonder that mystics have always held strongly to such simple mathematics as they could understand and use, and that they have affected such mathematics as surpassed all human comprehension. (Herrick Berkley).

The recent astounding discoveries in physics, radio-activity, ethereal space, and the principle of relativity have so aroused the wonder sense of physicists that a mystical interpretation has grown up, especially in Germany, in lieu of a rational, scientific explanation. Professor Magie devoted a large part of his presidential address (*Science*, February 23, 1912) before the Section on Physics of the American Association for the Advancement of Science to setting forth the dangers of this dalliance in occultism.

As a man values his own mental integrity and the rational activity of his own reason, he should maintain the strictest criticism over the evidence submitted for the establishment of the mystical and the occult, as well as an equal criticism over the methods of argument from indisputable facts. As we all value the intellectual integrity of our profession, and as we are all jealous of its scientific and rational judgments and opinions, so we should combat by every means in our power the insinuation of the smallest vestige of fakirism, occultism or mysticism into the accredited material of our science.

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CONDITIONS OF RESEARCH IN PSYCHIATRY.

IN considering the conditions under which research in psychiatry is likely to be rewarded by success, we are at once met with the query, "Have the conscious efforts of man or have accident and necessity heretofore been preponderant factors in fortuitous discoveries?" Some philosophers contend that all conscious research is misdirected, wasteful, extravagant and unproductive expenditure of energy, that it is the whole duty of civilization to utilize the discoveries that accidentally and spontaneously eventuate in the course of the ordinary affairs of life. There can be little doubt that most of the discoveries which gave man the power to rise from animalism to savagery, from savagery to barbarism and from barbarism to the beginning of civilization, were fortuitous accidents; but thereafter, on account of the complex field of science, and especially as it concerns us, of the complex field of pathology, advances have been made and they may be expected to result only on well-planned and conscious research by well organ-

ized and well-trained squads of engineers in research.

It is an undoubted fact that the earliest and most conspicuous advances of the human mind into the dark continent of ignorance and of the unknown have been wholly accidental and un contemplated. Such accidental discoveries are still going on, but it is also a fact that during the last hundred years at least, conscious and purposeful researches have been undertaken and new and valuable discoveries, which never could be disclosed by any conceivable accident, have been made with the aid of the systematic and orderly arrangement of facts previously discovered by necessity and accident alone. It is said that the gourd or woven reed basket was first covered with clay solely to prevent it from being burned by the hot ashes or stones which were the means used for cooking its contents, and that in this manner the art of pottery was secondarily and accidentally initiated. Such a problematic explanation of a prehistoric event is good enough and certainly similar accidents to-day lead to valuable methods or inventions. This accidental method of discovery is the method of the earliest stages of civilization. The development of science marks the beginning of the middle portion of our present civilization.

Science is made up of systematized, verifiable facts. A verifiable fact is one which may be perceived not only by the original observer, but also by those to whom it is communicated. Generally speaking, facts are intellectually valuable to one largely in

proportion to his ability to observe them for himself. Such observable facts are particularly impressive. It has often been said that every scientific fact may be demonstrated *ad libitum*.

We know that facts are of various sorts and may be discovered in various ways. Many facts are discovered by direct observation and such facts are abundant in biology. Other facts can only be determined by hypothesis and experiment. Such facts furnish the basis of physics and chemistry. It appears axiomatic that the value of a fact does not depend upon the manner of its discovery. Furthermore the relations which facts bear to each other are equally important facts or truths. Science then is the classification of verifiable facts. These facts may be determined by observation and communicated by description. Such facts are the elemental facts of every new science, and they furnish the maximum quantity of material for the sciences in their early development, for example, in biology and in medicine. These facts are relatively easy of observation, and each isolated observer is able to make more or less reliable and exact observations and descriptions.

Other scientific facts or truths are determined by interpretation. In the interpretation of facts a higher mental development is required than in their observation, and such an interpretation belongs to a later stage in the development of each of the sciences. The biological ideas of Linnaeus and Cuvier were chiefly descriptive; those of Darwin and Mendel were inter-

pretive. The former consisted of a maximum number of isolated observations; the latter of an interpretation of maximum application. The former almost entirely neglected relations; the latter considered relations of prime importance. The former used a minimum amount of thought and interpretation; the latter required the maximum amount of imagination, inference, induction and judgment. The former was the more exact and liable to the smallest margin of error; the latter was the more comprehensive, the more hypothetical, and needed the greatest amount of corroborative proof and experimental verification.

Aristotle taught that we sometimes infer from particular facts to particulars; this method is termed analogy. He said that we sometimes infer from the particular to the general or the universal; this method is denominated induction. He said that we sometimes infer from the general or the universal to the particular; this method is termed deduction. Analogy, induction and deduction are the methods of different stages of civilization. Analogy is the method of animals, savages and barbarians; deduction and induction are the methods of the philosophers and of civilization.

Mathematics was undoubtedly the first of the sciences to be systematized. In the very earliest stages of human society man required some sort of numerical notation. The fingers and toes naturally determined the decimal system which arose almost uniformly and spontaneously among all primitive races and people.

The facts of numbers then were the first facts or truths of mathematics. The facts of mathematics are few in kind, ideal in description and simple in their relations as compared with those of the natural sciences.

When man became agricultural in his habits, mensuration became necessary in fixing, describing and separating adjoining cultivated fields. The essential elements of geometry arose from the primitive necessity of measuring the garden patches of the valley of the Nile. How far mathematics in the form of arithmetic and geometry advanced in the first civilization of which we have any record is readily seen in the Ahmes Papyrus, which is an Egyptian treatise on mathematics, copied 1700 years before Christ, from several earlier compends.

Astronomy was a descriptive science among all nomadic, pastoral and barbarian people, but it became a deductive and inductive science only after it was wedded to mathematics and when men began to "go down to the sea in ships." Its progress depended upon the coincident construction of accurate mechanical and optical contrivances, and not until the latter half of the 18th century had the art of constructing chronometers and sextants and the science of astronomy advanced together to such a point as to make astronomy a science and the paths of the sea plain to the navigator.

It would appear easy enough to determine what is a fact or truth, but unfortunately nothing is more

difficult. The difficulty often lies in the interpretation of the observation and its record. When we say that a certain man has smallpox we express an opinion relative to the condition of a particular man and a generalization of previously observed facts which we term smallpox. Yet of the actual etiology of smallpox we still confess our complete and embarrassing ignorance. Its manifestations alone are known to us. Even so fundamental and simple a generalization as gravity is really outside of human comprehension. Man can realize only the manifestations of gravity. Since it is necessary to express facts in order that others may realize our discoveries we have to use language in a new sense, in a sense that it has never before been called upon to express. The attempts of good observers or good thinkers in the fields of induction or deduction, in the fields of inference or of judgment, are not equally happy or successful in the use of language.

The interest, motive or vision of the votary of scientific research must be all-consuming. It is related of Archimedes that while Syracuse was being stormed by the Romans he was engaged intently upon some geometrical theory and heard neither the noise of the seige nor perceived that the city was captured. In the midst of his abstraction, in the contemplation of a difficult problem, a soldier came suddenly upon him and ordered him to follow him to Marcellus. This Archimedes automatically refused to do until he had finished his course of reasoning; whereupon the sol-

dier, enraged, drew his sword and ran the philosopher through. Modern votaries of scientific research must be equally absorbed and self-forgetful. Not a few examples of such self-forgetful interest have been furnished in most recent times. Howard Ricketts, in his pursuit of the riddle of typhus and mountain fever, fearlessly sacrificed his life in his search for truth. Lazear, Carroll, Reed, Agramonte and Finlay made equally self-sacrificing ventures in the solution of the problem of yellow fever and by their uncompromising courage they have rid the tropics of the greatest barrier to civilization and opened up to colonization a continent more promising and richer than the Indies.

The methods, the means and the conditions of research are matters of philosophy, and the philosophy of a people is an expression of a sort of sea-level atmospheric pressure of that people's common sense, intellectual experience and emotional life. The aristocracy of the erudite philosophers of any age is a negligible quantity in the intellectual and social progress of that age, except so far as their philosophy is able to elevate the common sense, the common judgment and the common emotional activity of the community. Each philosopher predicts the impossibility of the philosophy of one who would offer a more embracing system. For example, Kant said: "It is absurd for man ever to conceive of the idea that some day a Newton will arise who can explain the origin of a single blade of grass by natural laws, uncontrolled

by design." Yet in but a short time Haeckel made the statement that such an impossible Newton had appeared in the person of Charles Darwin. By the philosophy of his time Rokitanski found that typhoid fever was generally considered a nervous disease or one of a bilious-nervous, or gastric-nervous origin, but through careful *post-mortem* research he fixed the morphologic pathology of this disease upon a distinctly physical basis. He demonstrated the typhoid ulcers and the typhoid adenopathy, but we waited three-quarters of a century before Eberth and Gaffky demonstrated the *materia morbi* in the typhoid bacillus.

After the researches of Hoffman and Schaudinn had demonstrated the *spirocheta pallida* of syphilis and coincidentally the trypanosome of sleeping sickness yielded to atoxyl, Ehrlich and Hatto began their well-planned and successful research for a cognate remedy for syphilis. Fortunately the researches of Bordet and Gengue had placed in the hands of Wassermann the material for his invention of the hemolytic, diagnostic reaction known by his name and this made the practice of syphilology the most scientific, the most positive and the most promising field of therapeutics.

Probably Ehrlich's campaign of research into the therapeutics of syphilis is the most instructive in the warfare of modern medical science against disease. It should be read with some knowledge of the basis established by the enthusiastic work of Metchnikoff and his school upon which its successful prosecution

was made possible. The pursuit of pure science is an adventure into the most mysterious and rugged surroundings and requires the most self-denying and intrepid purpose. The difficulties and discouragements of research exceed those of any other calling or any other occupation. Obstacles within the subject itself are immeasurable, indefinable and inexorable. Obstacles without are dispiriting and distracting. The research man regardless of his associates, is a solitary soul without effective sympathy from his associates in his intellectual campaigns. He is surrounded as a rule with a spirit of conservative pessimism and supercilious doubt. Even his own mental integrity and sanity is apt to be questioned.

The research man must possess a scientific habit of thought. His mind must be stored with the chief facts and the systematized principles of every science, as represented by the best thought of the age in which he has been educated. He must moreover have a fertile imagination, a ready invention and well-trained method and technique and habits of observation and reasoning beyond any criticism.

Modern society has no established or standardized place for the research man. In the army and navy we have topographical engineers and navigators, hygienic engineers and strategists, sappers, miners and a regular corps of scouts. But organized, peaceful society keeps no body of scientific scouts on the growing frontier of our inimical ignorance. The research man must guard against undertaking the discovery or the invention of

the impossible, and he must train himself to carefully analyze the proposed field of his adventure. The most unlooked for facts are frequently discovered and the most obvious facts are as frequently overlooked. He must remember that all research is time-consuming and that the first appreciation of an original fact or idea requires an almost interminable intellectual labor, and an unequalled expenditure of time and energy. New truth rarely flashes upon the mind.

The perception of truth requires not only motive, vision and interest, but a certain sort of knack. The research man is more or less of a genius. Zerah Colburn had a mathematical knack or intuition, and so did the illustrious Euler and the calculating boy, George Bidder. This knack or intuition in research has been manifested most conspicuously by Ehrlich and Hatta in Germany and by Flexner and Noguchi in America. These geniuses have been unable to say how they accomplished their intuitions. Colburn was ignorant of the method of his mathematical feats and Euler, Kepler and Newton considered their fortuitous hypotheses as the residue of a multitude of hypothetical constructions, experimental applications, rejections and confirmations. To the very end of his life Newton was uncertain of the truths of his hypothesis of gravitation.

Inertia or antagonism is a principle of evolution, especially the evolution of the research man in psychiatry, and this antagonism may be for good or for evil; for progress or for stasis. At the present time re-

search in psychiatry is beset with a difficulty which is unknown in mathematics, physics and general biology. It is the fiction of the classical, the religious and the medieval soul. Since the time of Plato the superstition of a never-dying soul has hung like an incubus over the study of mental physiology and mental pathology, and now presents itself in a propaganda of pseudo-scientific, temple-building cults and sex-mad, transcendental, medical sects. The attitude of the medieval mind toward the plague, toward the sweating sickness, toward cholera, toward the dancing mania and toward all the diseases which we now understand as well as we do typhoid, syphilis and tuberculosis, was similar to the attitude of mind which is now manifested by these medical sects toward insanity.

II. DEVOTION TO PURPOSE RATHER THAN TO ACHIEVEMENT.

In initiating good works, the heart is often wiser than the head; emotion and passion are more adventurous than the intellect; but reason and a scientific purpose are far more untiring, indefatigable and persistent than passion, sentiment or greed.

The results of research have not always been the aim or motive that initiated their discovery. Columbus sought a short route to the Indies, and he added two continents to the arena of civilization. Astrology and alchemy pursued the fatuous and the chimerical, and discovered the universality of physical law and

the inexhaustible treasures of earth and air. The Puritans would escape to the wilderness to seek religious freedom and individual equality, and they found on their hands an unprecedented task of nation building. Eli Whitney made a cotton gin to cheapen the seeding of cotton, but he began the end of bond slavery and was forced into evolving fire arms for the great civil war.

In science much the same conditions have prevailed. Probably no single organization has been more unpremeditatedly instrumental in the encouragement of rational research than the Royal Institution of Great Britain. This establishment was organized in 1797 by two Americans, Benjamin Thompson (Count Rumford), and Thomas Bernard, with the help of a few dignitaries and philanthropists of England. It was designed "*to better the condition of the poor,*" and soup kitchens, cheap cooking and warming arrangements were among its earliest activities. These led naturally to the study of food and fire and Humphrey Davy was given a laboratory for his pioneer work in chemistry. His miner's lamp is one of the best remembered discoveries of his thirteen years of research in the institution.

Michael Faraday's fifty years with the institution were epoch making in electricity and to-night, in my remote country house on the shore of Lake Michigan, I write by a light produced by a dynamo, the invention of which rested upon his observation in 1824, that the proximity of a magnet to a coil of wire induced in it

an electric current. By slow and tortuous research the science of this invisible power has been attained and the world given a sleepless servant, instantaneous communication, and a broader horizon. The source of energy no longer determines its place of expenditure. Space and time have been conquered by the achievements of the activities of an institution founded "*to better the conditions of the poor.*"

The Royal Institution of Great Britain also gave John Tyndall his opportunity in the arena of scientific research. Through Tyndall's study of fermentation and his refutation of Bastian's spontaneous generation, the foundations of antiseptic surgery and bacteriology were firmly laid. The success of the Japanese over the Russians; the building of the Panama Canal with a morbidity as low in that damp tropical climate as that of any similar work elsewhere; and the falling death rate of all civilized nations rest on the utilization of Tyndall's simple, but epoch-making observations and rational deductions therefrom.

Dewar's production on the same foundation of liquid air and liquid hydrogen are startling achievements which are still of little practical utility. It is not difficult to conceive that these new labors of the Royal Institution will some time furnish the means of some great practical service to man equal to that of the Davy lamp, the Faraday magneto, or John Tyndall's flasks of sterile beef tea.

When Benjamin Thompson (Count Rumford) would "*better the condition of the poor*" he taught

by example and precept how to save seven-eighths of the wood by properly constructed fireplaces and kitchen ranges, as much in food and groceries by utilizing the waste products of the kitchen and selecting proper meats and vegetables, but his pupils Davy, Faraday, Tyndall and Dewar have by their unanticipated discoveries given the poor and all mankind thousands of untiring servants and rid them of hundreds of unseen, but venomous and relentless foes.

The character of Count Rumford is worthy of study by every prospective student of research in psychiatry. He was a worthy leader of his greater disciples. He had the education of his native New England village school; narrow, intense, smug, utilitarian, emotional, reverential. One of his teachers was a graduate of Harvard. Benjamin Thompson, as a boy, despised farming and undertook commerce, but the Revolution broke out and commerce came to an end. He taught school at Rumford, now Concord, New Hampshire, where he married a rich widow, Mrs. Rolfe, by whom he had a single daughter. His adherence to the British cause compelled his flight to England, where his gracious manners made him many friends. He did good service in the British army in America. To better the condition of the soldiery and to increase their efficiency, he reorganized the commissary and barracks, wherever he went. He became an authority on all military affairs, and showed the benefits of his system everywhere he applied them, in England, in Georgia, in South Carolina and on Long Island. It

was at Huntingdon, Long Island, that his attention was first fixed on heat in planning and constructing fireplaces for the barracks of his command, which command he held until the close of the war. In 1783 he was put by the British Government on colonel's half pay, which he continued to receive the rest of his life.

At the close of the American war he became interested in the threatened war with Turkey. On his way to Vienna, he met, by pure accident, Maximilian, prince of Bavaria, and a warm friendship which determined his subsequent career, sprang up between them. The Austro-Turkish war failed to come off and Colonel Benjamin Thompson returned to Munich, where he undertook the reorganization of the military service of the Great Elector. This trust was so well performed that incidentally the beggars, tramps and thieves that had been the bane of the country, were put to work. Thompson remarked, when advancing his scheme, "To make vicious and abandoned people happy, it has generally been supposed necessary *first* to make them virtuous. But why not reverse the order?" With this motto he accomplished a national social work. In 1785 he made experiments with heat and clothing, the results of which he communicated to the Royal Society on March 9, 1786. In 1790 he was made Count Rumford; his wife died the following year. In 1796 he published "A Plan for a Society for Bettering the Conditions of the Poor," which was materialized in London while he was away in Ger-

many. The same year he made experiments which led him to announce that *heat and motion were one*. That year he gave \$5,000.00 to the American Academy of Arts and a similar sum to the Royal Society for medals to be awarded for valuable contributions to the knowledge of heat and light. He won the first medals himself.

During all these years of scientific devotion and public activity he was in miserable health, expatriated from the land of his wife and daughter, whose properties had been confiscated, and deprived of many of the rewards of his military service in Bavaria by his foreign nativity.

His devotion, his vision, his enthusiasm, his knack, his unperturbed optimism and devotion to truth, his kindness of heart and breadth of sympathy with all men, his courtly manners and gentle addresses, and above all, his indefatigable industry and singleness of purpose are models for votaries of scientific research. We may regret that he did not remain true to the interests of the colonies, but we must rejoice that he was born an American and one of that generation that gave to international philosophy and science a Thomas Bernard and a Benjamin Franklin. The Peabody Institute, the Smithsonian Institution, the Lowell Institute, the Carnegie Institutions and Foundations may, any one of them, become as potent jetties in determining the course of scientific progress as the often bankrupt *Royal Institution*, but so far they have not done any notable epoch-making work or our

perspective does not give us the proper valuation of their achievements.

The laboratories of the Agricultural Experiment Stations and Rockefeller Institute are now the arena of a group of adventurers and scouts on the fighting line of inimical nature. The problems of the insanities may be, or they may already have been solved in some of their many undertakings, but the burden of utilizing their seemingly impractical work awaits a new generation of votaries to human progress.

THE ELIZABETH THOMPSON SCIENCE
FUND FOR THE ENCOURAGEMENT
OF RESEARCH.

IN 1885, Mrs. Elizabeth Thompson, widow of Thomas Thompson (+ 1885) gave Dr. Charles S. Minot, of Boston, five thousand dollars for the promotion of science, and a little later twenty thousand dollars more, and left him sole and absolute discretion in the use and application of the money and the management of the fund. She intimated at that time her intention of adding to the fund from future accumulations from the income of the fortune left her by her husband. Her health failed, a conservator was appointed, and this laudable intention was never carried out.

A trusteeship was formed by Dr. Minot for the execution of the trust placed informally in his hands, and Dr. Henry I. Bowditch, Professor Edward C. Pickering and General Francis A. Walker became trustees.

They early decided that only the income of the fund should be used to encourage researches having in no respect a commercial character ; that preference should be given to research involving the co-operation of a number of observers, and especially to researches in-

volving international co-operation; that grants should be made only for actual expenses of investigation and not for salary or support; that the grants should be distributed over various departments of science and various countries and localities, and that only researches of cosmopolitan interest should be abetted.

When the first announcement of the purpose of the fund was published in 1885, an unexpectedly large number of applications for assistance was secured. At that time and for a few years afterward a number of applications came from obvious cranks, but of late few appeals from such persons have appeared.

In the recent report of the secretary of the trustees of the fund, we learn that during the first twenty-five years of its existence 169 grants were made. Eight of these grants were, however, withdrawn, leaving 161 effective grants. Of these 113 have been successful in the sense that the researches have been completed and the results published. Twenty-eight researches are still in progress. Four investigations have been interrupted by death. In six instances the investigations were carried out, but the results were inconclusive and are not looked upon as satisfactory. The good faith of the applicant and purpose of the grant were carried out in every case, except three grants to two different persons.

These 169 grants were all very small, averaging about \$250 each, and a large number of them, 1 to 15, have resulted in good work and distinct advances of science.

We notice among the recipients several names which have, since the grants were made, become widely known for their connection with scientific progress, and not a few of these connected with medical science.

This fund has been so wisely administered that the trustees are not at all presumptuous in offering to accept and administer other funds that may be entrusted to their care.

* * *

There are men at work now on problems related to psychiatry who would be greatly aided and their work facilitated by such financial assistance as this fund has furnished to more than 150 investigators.

The great Rockefeller and Carnegie funds are doing a marvellous work in encouraging research. The Pasteur Institute and the numerous laboratories and institutes in Europe are pressing forward into the great continent of the unknown. The encouragement of research in pure science has not been slow in bringing returns and in advancing civilization. It is said that the results of W. H. Perkin's researches in the coal tar products have been worth more than \$20,000,000 a year to the world every year for half a century, and the value of the medical anilins can hardly be measured. The Department of Agriculture expends \$16,000,000.00 a year, and no inconsiderable part is in research designed to aid or protect agriculture. Similar departments are supported less liberally by the governments of Germany, Holland, Sweden, and other European countries. The results are published in

weekly, monthly and occasional bulletins, and the value of these researches have made famine, the national calamity, a stranger to the civilized world for nearly half a century. These researches have strengthened the foundations of a world wide prosperity and economic stability and done much to perpetuate a world wide peace.

It seems passing strange that with such an intelligent and liberal government as ours, so ready to conserve and augment all our national resources, that man, the grand resource on which all others depend, should receive no place in any department.

The various states in the union expend a large portion of the State Budget on the custody of the insane. Illinois during the past biennium expended more than forty per cent. of her total state disbursements on the custody of the insane and other dependents (not criminal) and at the same time appropriated only \$4,000 a year to the Psychopathic Institute, the only possible institution of research into the causes of the insanities.

Private initiative could well show itself effective in research for psychiatry by placing in the hands of such a board as that of The Elizabeth Thompson Science Fund moderate sums to be used to encourage a study of the conditions of the insane and the possibilities of cause or prevention of insanity. The problem is one that involves more than a quarter of a million citizens in the United States, and success would mean a saving of a major portion of the expenditures of each of the States.

There are now a number of researches called for by work already done which could be facilitated by small grants. Young life is wonderfully venturesome. The progress of biology, chemistry, serology and several other departments of research yet unnamed, is absolutely bewildering. It is difficult for those who utilize to keep pace with those who theorize. The several tissues of the body can now be grown and the products of life studied one by one. The frontier of our ignorance is all the time opening to our amazed vision and our challenged imagination. With so many means of flanking our enemy, disease and ignorance, we need greater numbers of young research men and more financial encouragement, such as the Elizabeth Thompson Fund has extended during the last twenty-five years.

THE NURSING OF THE INSANE AND RE- SEARCH IN PSYCHIATRY.

IT is very difficult to use a particular function of the service as an index of the inefficiency of that service, without arousing the criticisms of the particular class under consideration. At this time we would, however, call attention to the low grade of the nursing in the hospitals for the insane in order to enforce upon the mind the necessity of changing the motive of these institutions from confinement and custody to research and cure.

Here we are at the beginning of the second decade of the twentieth century and the insane are suffering of diseases of unknown origin; they are confined for the safety of the sane; the State is squandering 40 per cent. of its gross budget on confinement and custody, and not a dollar is appropriated in any one of the forty-eight States for *serious research* into the causes of the insanities and the possibilities of cure and prevention.

Are the causes of the insanities more sacred from modern scientific research, more secure from discovery by human cunning, than those of the Black Death, of the malaria of the Campagna, and the sleeping sick-

ness of the Congo? Is there hope in research for the locoed cattle of the plains, but no hope for the deluded quarter of a million of citizens filling our mad-houses, coming from every walk of life, from every age, from every social condition? Is it profitable to expend under the Department of Agriculture \$16,000,000 a year in studying the diseases of cattle, of wheat, of corn, of elms, of chestnuts and of carp, and yet unprofitable to expend an adequate sum in seeking for the diseases which underlie the insanities?

There was a time when the general hospital was the retreat for the helpless incurable, just as the insane asylums are now the refuge for the hopeless deluded. The condition of the Hotel Dieu of Paris a hundred years ago, before there was any safety in surgical maneuvers or hope of serolytic examinations and treatments, is parallel with the present condition of the great institutions for the insane which are dotting every State and are the pride of the philanthropic and the spoil of the politician. It was the result of the researches of Tyndall, of Pasteur, of Lister, of Rosenbach, and of Ogston, that erysipelas suppuration and hospital fever disappeared, and the general hospitals of the world became as safe for all surgical operations as the huts of Russia had proved to be in the hands of Pirogoff during the Crimean War.

Probably no part of the revolution in general hospital practice was more radical and more fundamental than that of the nursing. With the hospitals for cure came the professional nurse. The everyday ceremonials

of nursing, so ostentatious and striking to the layman, were each of them established by research, by demonstration, by argument, and by painful discipline. A whole generation, a whole army, it seemed of "practical and experienced" nurses, had to be driven out of their intrenchments in the hospitals of the 1870's and 1880's, before these necessary ceremonials could be faithfully and reliably instituted and conscientiously carried out. The professional nurse is now a necessity to the hospital and a fixed and recognized member of our social structure.

The madhouses of the forty-eight sovereign States of this republic are now, by grace of legislative hypocrisy, termed State Hospitals, but they remain institutions for legal confinement and segregating custody. In no sense are they hospitals for cure, and no allegation which the naive might make regarding them would be so emphatically and superciliously denied by the superintendents of these institutions as that they were hospitals for cure.

It is absolutely necessary to resort to the concrete because the abstract is pointless. In spite of the risk of giving local offense and rousing local criticism, for example, this important lesson will be presented. In the State of Ohio there is a State hospital which underwent a revolution five years ago on account of the condition of its nursing. A wily newspaper man in a metropolitan city was committed to this institution in regular judicial form. He made notes of his observation in the court of commitment and his subsequent

experiences in the "hospital" in which he was confined. Among other things he saw insane men cruelly "beaten up"¹ and after these beatings-up, secluded for days from the doctors by the nurses, who held that discipline in the ward was paramount to all other considerations. He saw a woman nurse twist the arm and shoulder joint of a recalcitrant female patient until she fell to the floor in agony. He noted many other atrocities which came out in the metropolitan press as a part of his lugubrious diary. This reporter was not insane; his legal commitment was not justice; the State hospital to which he was committed was not a hospital; the nurses were not nurses; the investigation was not undertaken to better the condition of the insane or remove a scandal from the public service, but it was done to divert the patronage of the institution into other channels and secure the spoils for another political gang. No sooner did the diary begin to appear in the newspaper than the nurses began to disappear from the hospital like rats from a sinking ship. The board of trustees was horrified! The medical staff was investigated and re-organized, but the same sort of nursing continues. The same "beating up" discipline prevails.

In this ancient castellated fortress of the style of

¹ This is a technical term not found in this sense in any dictionary, and used only among the nurses and attendants of the insane. It consists of an attack upon the patient by two or more nurses; over extension of the patient's head, knocking down the patient with the fist on the lower jaw, kicking the abdomen, stamping the chest and treading violently the chest and abdomen with the knees.

1855, the State of Ohio legally confines 1,300 of its citizens of all ages and all estates, in a most inflammable and illy-constructed building, in close proximity to a great city, under the care of six physicians, two of whom are burdened with administrative duties, and ostensibly nursed and cared for during the year by more than two hundred different nurses, called attendants,² who are paid from twenty to forty dollars a month. The total expense to the State of these 1,300 insane citizens, is about \$250,000 a year, of which \$65,000 was paid in one year for the wages of 194 employes of all sorts and kinds. At the same time \$134.00 was expended for books, \$1,004 for stationery, \$1,362 for drugs, and \$707.00 for other medical supplies, including one compound microscope. In his report, the new superintendent of this institution lays great weight upon the clinical uses of this microscope, and of the recently established clinical laboratory.

However, during the summer of 1911, a citizen for many years of an adjoining county was brought tied hands and feet to his own barnyard gate, a committed lunatic to this State hospital. With fear and trembling the sheriff and his big-eyed posse carried the prostrate man from the automobile which served as an ambulance up the short stairway and laid him down upon the tessellated floor of the examining room. As the attendants began to untie this patient, the sheriff and his

2 A peculiar method prevails in hiring and paying the attendants. They fill out napers on taking the job, but do not sign their names. They are paid in gold but do not sign receipts!

fearful posse silently vanished. The ropes were removed, the man was taken without disturbance to the bathroom, where he was stripped and bathed, his wounds were dressed and he was properly attired and taken to the ward. There he soon became a model patient. One morning, however, before he had dressed, he perched himself upon his table and began a fervent exhortation to an imaginary audience disposed about the opposite side of his bedroom. His attendant nurses called him down, but he proceeded with his sermon unmindful of their orders. They then went in, grabbed him from behind, threw him upon the floor, pounded him under the chin, over-extended his head, punched him under the ribs, stamped upon his abdomen, and beat him up generally, according to a method well-recognized by these nurses. In two weeks he recovered of the beating and also of his insanity and in due time he was discharged, and in his right mind. His attendants, or nurses, are still in that same ward, drawing from thirty to forty dollars per month from the State, and collecting twice that much from the tips and perquisites wrung from the helpless and agonized friends of the legally committed insane.

These turnkeys are in control of the custodial institutions. Their philosophy of nursing is the prevalent one. In some of the states that have entered on the civil service bondage, they are impregnable and cannot be discharged until the superintendent has filed a writ containing the charges of misconduct and all the evidence upon which the charges are to be sustained. All

new nurses coming into the service must soon conform to the customs, the ethics and the discipline of these old stagers. The patients in the ward do the services which the nurse should be proud to perform. It is below the dignity of such a nurse to clean up an untidy patient or to show that prescience which anticipates the untidy act. By their "bossy" attitude toward the helpless patient, by their unwillingness to take the most unusual and unpleasant tasks upon themselves and perform them as a nurse's privilege and duty, all service to the patient is made servile and thus robbed of its humane motive and its professional dignity. The physicians number hardly one-fortieth as many as the attendants, and they are powerless before the entrenched position of nurses who have been on the ground for years. This is a lamentable condition and it is maintained not alone by the overwhelming majority of the attendants, but by the far more lamentable fact that the physicians themselves are appointed not for the serious object of cure, but to hoodwink the public and the friends of the insane into the belief that the spirit of the State Hospital is not for confinement and custody but for research and cure. If the doctors were numerous enough and if they were serious enough in the investigation of the physical conditions of the insane, and in the application of such therapeutic measures as are already known, and in the discovery of other measures which a knowledge of the condition of the insane might give, such a revolution in the nursing of the insane could be instituted as would make as great a

change in the nursing of our State hospitals as occurred in the general hospitals of the world with the advent of Listerism.

To our mind there is not one of all the long list of devoted servants of man so worshipful as the faithful nurse. The miner in the stillness, the loneliness and the overpowering darkness of the roots of the mountains; the diver in the mysterious labyrinths of the beds of the sea; the hopeless toilers at industry's relentless and tireless machines; the lonely pioneers on the firing line of civilization; the venturesome sailors and toiling fishermen, the patient seamstresses and alert weavers; the isolated, benumbed and discredited maid servants; the unclad, perspiring stokers in the depths of the steamships and the diamond diggers imprisoned in their compounds, are robbed of no whit of their mead of honor by our reverence for the faithful nurse. It is superbly heroic to care for the helpless infant, to wait on the aged to their silent end, to ease the agonies of the victims of cancer until the painless sleep comes on to stay, but these patients can give some look of gratitude or speak some word of appreciation, but the greatest hero of them all is the faithful nurse of the irresponsible insane.

The insane show no appreciation, but, on the contrary, the most perverse, malignant and bestial ingratitude. The kindest and gentlest attentions win abuse, vituperations and blows. The nursing of the insane requires a fortitude greater than that of the lion tamer, a cunning beyond that of the trapper, a

gentleness of spirit exceeding that of St. Francis, a tireless devotion greater than that of the mother to her first born. To nurse the insane is to fulfill the last and most exalted function of personal service required by our highly complicated social organism. The nurse of the insane is the personal dispenser of the physical realization of the humane spirit of modern civilization.

The rewards of the nurse of the insane are small indeed. He has no adequate remuneration and no recognized social position. His services are unseen by the public and unappreciated by his patients. Not so with the general nurse. The infant is soon nursed to health and a promising boyhood or girlhood. The aged and the victims of malignant disease linger but a short time in helplessness and agony before they win the goal of sleep and rest; but the insane, suffering from an unknown, unsought, unstudied and hopeless malady, with the most terrible and perverse manifestations, must be devotedly and patiently nursed from *year to year*, through a relentless succession of the most exasperating, infuriating and disgusting manifestations of the disease, without appreciation, thanks or gratitude—nursed from one decline to another and another still more gruesome and more soul-wrecking, until the nurse, robbed of his own zest of life by the horrors of his daily experience and his patient denied the surcease of death, must call on the cold dictates of his sense of duty and the unthinking consolations of an ancestral religion in order to maintain his mental integrity.

How different would it be if confinement and custody were supplanted by research and cure; if the spirit of fateful pessimism gave way to active optimism, if sordid routinism was displaced by alert progress. Speed the day.

RESEARCH IN EPILEPSY—THE LIGA.

THERE is a remarkable advance in the international spirit in all departments of science. An international chemical society has been formed which is in reality a federal body with legislative as well as advisory and deliberative functions.

Die Brücke (the Bridge) was organized a year ago last May to open communication between those who know for the sake of knowing more and those who wish to know for the sake of doing better.¹ Branches have been established in Boston and Chicago and the promotor, Wilhelm Ostwald, gave his Nobel prize of \$40,000 toward its endowment.

On September 6 and 7 there was organized another international society designed to co-ordinate the work of the students of epilepsy in a tremendous effort to solve this terrible problem. It is called "the Liga for Research in Epilepsy." Any person interested in the subject can become a member of this Liga by paying five dollars a year to the secretary. Each member will receive the proceedings (*i.e.*, *Epilepsia*) and be entitled to all the privileges of membership. In the first

¹ Buher and Saager: Die Organisierung der geistigen Arbeit. durch "Die Brücke," Ansbach, 1911, pp. 177.

section of the call the motive of the society is fully stated.

"1. The Liga intends by the co-operation of all countries to make the epilepsy problem the object of special study, and to make practical use of the results of such study."

In the United States about one in every 367 individuals is epileptic. These unhappy individuals have an average life seven years shorter than other citizens. and die at a mean age of thirty-three years. Out of each 100,000 living in the registration districts of the United States in 1909, 4.3 persons died of epilepsy. The death rate at the same time from all causes was 1.580 in each 100,000 living in the same area.

Several States have provided colonies for epileptics. Ohio has a pioneer plant at Gallipolis, where some very promising researches were cut short by sordid political machinations. The Craig colony at New York is the center of active education, and other colonies have been established or institutions built by Missouri, Kansas, Michigan, New Hampshire and Connecticut.² Even in the schools of many of our cities, special provisions are made for epileptic children.

Taking all the activities in the several States into consideration, we readily see that much is being done to institutionalize the epileptics.

In the State of New Jersey and perhaps elsewhere it is lawful to castrate or spay the epileptic in the name of eugenics!

² Graves, Wm. C.: "The Care of Epileptics in Special Institutions." Trans. Nat'l Ass'n for Study of Epilepsy, 1912.

In no State, so far as we know, either in Europe, America or Asia, has the law authorized euthanasia of the epileptic, the idiot or the insane. If it is rational to castrate and spay those we think unfit for reproduction, it ought to be equally rational to execute those we think unfit to live. In the case of murderers we do legally kill. In the case of imbeciles and criminals we do legally castrate and spay.

It seems to me that the Liga has chosen the better way. It proposes to *study* the condition of the epileptic. It assumes that epilepsy is a solvable problem. It optimistically undertakes the burden of this solution. When years are spent in a fruitless search for the causes and conditions of this dreadful affliction the Liga may propose desexualizing every member of every family in which an epileptic appears, and it may recommend euthanasia for the demented epileptic.

Our ancestors looked upon epilepsy, idiocy and insanity as the dispensations of God and hence beyond human power to prevent. Some even now hold to this idea; since their opinions are made without evidence their prejudices yield to no argument.

To us who have studied the long history of man on the earth, and seen him conquer one after another of the inimical forces of nature by cunning hypothesis, exact experiment and rational deduction, the ultimate solution of the epilepsy problem is an assumed prophecy.

Epilepsy, like insanity, is symptomatic of many different underlying etiologic entities. It may be that

one of these entities shows itself in one individual as epilepsy, in another as insanity. We know already that certain idiots are accompanied by a persistent thymus and that the persistence of this fetal gland is characteristic of certain epileptics also.

It is not too much to hope that the solution of the problems of epilepsy will open up new ways into the dark continent of insanity.

The hope of civilization in a world-wide personal safety was not realized through an exacting criminal code and its stringent execution, but through the plenty that was furnished by commerce and labor-saving machinery. Steam, electricity and scientific hygiene have realized a world's peace. A man may now walk or bicycle over six continents and fear neither man on one hand nor beast, insect and disease on the other.

We cannot believe that any acquired characteristic is transmissible. As a man who has lost both his legs may be the father of a large family of biped children, without spot and without blemish, so it seems might an idiot that had lost some essential brain tract at birth as a result of injury or disease father a perfectly healthy child, perhaps a genius or a saint.

Civilization has exterminated nearly all the isolated savage races. There is something lost to the world which the exigencies of future civilization may require. In the epileptic, in the insane and even in the idiot there may rest something that the inconceivable emergencies of the future may require.

No medical man who holds himself bounden by the traditions of Hippocrates should ever take part in the legalized mutilation of human kind. No medical society should ever sanction castration and spaying by the officers of the State, until the last mite of the State's resources has been expended in rational effort to discover and relieve the sad and dementing defects. If the State of New Jersey had expended years of research and loads of treasure in seeking the causes of epilepsy, insanity and idiocy, and had failed entirely, then perhaps it would be time for desexualization and euthanasia administered by the sheriff, but not by the doctor.

It is well for us to remember, to have in our morning litany and to recite as we approach every sick bed, every operating table and our consulting room this profound injunction of Hippocrates: "ABOVE ALL THINGS LET THE PHYSICIAN SEE TO IT THAT HE DO NO HARM.

MEMORABILIA OF A SURGEON-HEALER.

LET the surgeon-healer remember that he is under the same obligation and enjoys the same opportunities as the general medical man. He is not less than a doctor, but more. He is not a specialist by elimination, but by accretion. He is all that Hippocrates stood for, an *ιατὴρ*, a healer. He has, perhaps unusually developed, a deftness, a physical courage, a skiagraphic conception, a set of digital eyes; but he is not lacking in all the emotions, the imaginations, the intellectual activities, and the human sympathies of the proverbial "good doctor."

Let the surgeon-healer remember that he is not only a physician, but a man. He is by education and remuneration a leader of society in all that pertains to that mesa of thought to which the masses of society must rise in our next social system. The surgeon's conception of his place and duty must not be that of the tradesman or of the craftsman, but that of the idealist, the philosopher and the prophet. He must not take the pessimistic and provincial view of his knowledge and skill, but the optimistic and historical attitude towards them. When he looks at a condition or disease over which he has not yet attained a mas-

tery, he must not retreat. "To pronounce diseases incurable," Sir Francis Bacon long ago said, "is to establish negligence and carelessness, as it were, by law, and screen ignorance from reproach."

Let the surgeon-healer remember that he is not an artisan, a craftsman, or a technologist. Let him beware of the formalities so prone to quackery. There are certain affectations, elegances and mannerisms in the technique of many excellent surgeons that ought to be avoided. They distract from the motive to the method. Only the great can afford such trifling. Let the surgeon be a modest and reverential scientist, free from all self-consciousness and cant, and absolutely devoid of personal interest or cowardice. Let him be direct and positive, but considerate in even the slightest act.

Let the surgeon-healer remember that he is a pathologist of the living man. To the pathologic methods of the dead-house he has added those of the operating-room and the bedside. To the pathological anatomy of the autopsy-room, he has added the pathological physiology of the experimental laboratory and the autopsy *in vivo*.

Let the surgeon-healer remember that he must conform to the antiseptic ceremonial of the modern operating-room with a scientific conscience. These ceremonials have been established by years of struggle that few of the younger men who enjoy the safety of them ever conceived of. Each act in the operating-room conventions was won by well-planned experi-

mental research, correct reasoning, protracted argument, diplomatic maneuvers and persistent siege; but only within these ceremonials could the world-wide advance in surgical practice, in which all of us have taken part, have been so universally realized. The safety for which the older men fought, the younger men thoughtlessly and thanklessly enjoy. For nearly a quarter of a century these ceremonials were an end to fight for; now they are a means to inherit and to enjoy.

Let the surgeon-healer remember that the real field of surgery is still in the unexplored future. The moment that our profession begins to dwell upon its achievements in the past, or complacently contemplates its performances in the present, in that very moment it is a dead science and a decaying art. We have only begun our remedial work. We are fitted for new surgical adventures by our technique, by our pathological knowledge, by our physiological researches, and by our serological experiments, and we are protected in these adventures by the ceremonials of our operating-rooms; yet how few of us appreciate **our opportunities** and meet our obligations by pursuing discoveries in the limitless field of unknown possibilities. What a lesson, for example, has Alexis Carrel taught us! The transplantation of organs promises relief to many pitiable human creatures, and happiness to many desolate homes. It does not seem unlikely that in the near future the miserable and multiplying wards of the State may be treated by the surgeon-

healer with implantation of absent organs instead of suffering (God save the mark!) stupid, though perhaps well-meaning, mutilation by legalized spaying and castration.

Victor Hugo said man had undertaken to solve these Herculean problems. The first was the problem of religion, on which he struggled long; the second was the problem of society, in the solution of which he has still much to do; and the third was the conquest of nature, on which he has so recently begun. It is the duty of the surgeon-healer to be active in the solution of the last of these problems. In the conquest of nature, so intensely pursued by the physicist, the chemist, the manufacturer and the engineer, the surgeon-healer has taken, and must continue to take, a scout's part. The Temperate Zone, the open country, and the five seas, have always been free from many dangers that beset the Tropics, the city, and the river valleys. Through the labors of the healers from Jenner to Reed, the Tropics are open to civilization and the city is made safe as an isolated island in the sea.

Let the surgeon-healer remember that the value of a history of our science to the serious student and to the surgical neophyte is not likely to be overestimated. The clinical experience of the world is at hand. Hippocrates not only began his cyclopedia of medicine with a chapter on ancient medicine, but in the second section of it he says, "many brilliant discoveries have been made during the past, and others will be found out in the future, if a person

possessed of the proper ability and a knowledge of those discoveries that have been made, should undertake to proceed from them to prosecute further research." The history of our science is like the history of man, written and unwritten. The written history of man begins in the pictured surgical operations performed with flint knives and engraved with flint and copper tools upon the doorposts of the tomb of the nameless physician to King Atoty (or Orthos), of the sixth dynasty. This physician was buried more than 2,500 years before Christ. The written history of medicine extends through the Egyptian papyri, the Assyrian tablets, the Hittite inscriptions, the Talmudic and Confucian ceremonials, and the Charaka adages, down to the monographs and articles appearing in our multitudinous current journals. This long history must not be neglected by one who would pursue further research and extend our power over nature one step into the mystery and ignorance that surrounds us everywhere.

The history of research will show how important is a sound philosophy. Baconian methods were probably practiced long before Sir Francis Bacon lived, but they were nowhere so comprehensibly stated. With Bacon began that conscious systematic campaign of the human intellect and the human hand for the subjugation of inimical nature which marks the last three hundred years of human endeavor. The imagination and the emotions ever outrun the intellect and manual

achievements, and Bacon himself portrayed in the New Atlantis as much as the two centuries following him achieved. What Sir Thomas Moore did for social development in his Utopia, that Sir Francis Bacon did for the conquest of nature in the New Atlantis. What Theodore Roosevelt and Jane Addams are doing in solving the second great problem in humanity, Alexis Carrel and Jacques Loeb are doing to solve the last.

In the conflict between the church and the cruel society of the Middle Ages the monastic orders furnished a retreat for the devoted zealot. In much the same condition is the devotion of science today, and no less a man than Wilhelm Ostwald, who secured the Nobel prize in chemistry, has seriously proposed a fraternity of the votaries of pure science. The scientific professional man can not follow our barons of commerce or our captains of industry in economic aggrandizement and in material display without losing scientific caste.

SHALL IT BE CHARITY OR REASON? SHALL
IT BE EUTHANASIA OR RESEARCH?

I.

WE are living in a very peculiar civilization. It is simpering and sentimentally munificent, but cruelly and irrationally conventional. We have anti-cruelty to animals societies that watch our slaughter houses and our dog pounds and the cattle cars on our railroads, and employ policemen to watch the back alleys where our children are still allowed to play and where they sometimes cruelly tie old tomato cans to the slippery tails of stray dogs. We have child-welfare societies, united charities societies, legal aid societies, visiting nurses associations, immigrant protective leagues, institutional visiting societies, prison visiting societies, children's homing societies, societies for bettering the condition of the poor, schools of philanthropy and training schools for missionaries, and something like 4,000 other named societies as reported by the Census Bureau nine years ago.¹ Any one who wishes to see the record of ostentatious organized

¹ Special Report, Bureau of Census, Benevolent Institutions, 1904. Quarto, pages 335, Washington, Government Printing Office, 1905.

charity cannot do better than turn to the reports of the Bureau of the Census and read over at least the index of the same. In some communities 1.3 per cent. of the population are inmates of these private benevolent institutions and supported wholly by voluntary contributions. In the continental United States 347 out of each 100,000 inhabitants were so privately supported. This is a grand total of 283,809 inmates supported at the cost of about \$50,000,000 a year and cared for by not less than 15,000 healthy attendants.

Since these statistics were collected in 1904 the number of these institutions and the number of their inmates must have greatly increased, and it is difficult to compute what this riot of charity will come to. There is, however, one item in this unthinking and cruelly ostentatious benevolence that ought to receive for our purpose a more extended analysis. In 1904, 1,075 orphan asylums of one sort and another were reported, containing 92,286 children, cared for by 9,477 attendants with an annual expenditure of \$10,050,587. This, however, does not pretend to contain the commissions that were paid the solicitors for this \$10,000,000 contribution. Now, any one who has investigated the subject knows very well that the death rate of children in institutions is extravagantly high, varying from 10 per cent. a year to more than 50 per cent. a year, of the average population, and that the survivors, wholly disregarding the law of the survival of the fittest, are so riddled by the diseases through which they have escaped with their lives that few of them make self-

supporting citizens. The orphan asylum must be looked upon by every intelligent citizen as an absolutely unmitigated curse, unless they are to be considered as institutions for the production of a benevolent euthanasia.

In the Australian Commonwealth, which is composed of an area almost equal to that of the United States and a much more primitive and scattered population, there is not a single eleemosynary or State orphan asylum. In fact, there is not an orphan asylum in the whole continent, and has not been for thirty years. Every destitute child is provided by the state with a home and a foster father and foster mother. It is not because we do not know better that we continue to huddle together these 90,000 children in homes averaging a hundred a piece, with nine possible parents to each home; we do this in spite of the fact that Australia has shown us a better way. Upon the whole continent of Australia there is not a single monumental orphanage to kill off, maim, lame, and deform every inmate it receives.

II.

The irrational manner in which we treat our insane is quite as glaring and scandalous. There are committed to the 372 institutions of the continental United States each year more than 60,000 of her average citizens; 8,558 from New York, 2,000 from Michigan, 4,000 from Illinois. In these 372 lunatic asylums in the United States, there were on January 1, 1910, 187,454 persons in custody; 31,265 in New York, 6,669

in Michigan and 12,885 in Illinois. The annual expense for caring for these committed citizens has not yet been published by the Bureau of the Census. The sum total for the whole United States must, however, be near the fifty million a year mark. The State of Illinois expends 40 per cent. of the State budget on the custody of its 19,000 dependents; yet the epileptics are entirely neglected.

The population of the hospitals for the insane is about equally divided between the two sexes. There are a few more males than females. The death rate in these institutions is very high, and averages 72 annually for each 1,000 confined. The fact that 78 men die to each 1,000 men confined, while 65 women die to each 1,000 women confined, would suggest that the disease which produces insanity does not kill all of the men. Some of them die of the unusual confinement to which the women are already accustomed.

It is a fashion now, to call the old lunatic asylums, built during the last fifty years, "State Hospitals," but the character of the institutions themselves has not changed. The number of doctors in a State hospital is hardly equal to the standard of the average village or town of the same population. At the Dayton, Ohio, State Hospital, for example, with a population of more than 1,400 and a death rate close to 100 a year, there is a medical superintendent who has so much routine business to do that he can do no medical work, and two resident physicians. While visiting there on October 17, 1912, I saw among a lot of cases of dementia

precox a young man of about nineteen years who gave an extremely interesting history *apropos* of our contention that these institutions are not, in any true sense of the word, hospitals. This boy was employed in an adjoining town in unloading freight cars, and on May 29, 1912, was unloading a refrigerator car and was standing under the open, heavy refrigerator door of the roof. He was standing perfectly erect in this position, when, by some mischance, the door fell closed upon the top of his head and he was carried home unconscious. He came out of the concussion of the brain in about three hours, and suffered only a trifling discomfort thereafter. The next day being Decoration Day he did not go to work until the following Monday. He had been at work but a short time when he felt a strange mental anxiety and distress and a dreadful pain in his head. He seemed to be somewhat beside himself, and although a very sturdy and manly boy he held his head in his hands and cried bitterly. He was taken home again, where he remained for some time, acting queer, secluding himself in a dark room a good deal of the time, and refusing to eat at the table with the family. He felt a peculiar discomfort and occasionally an agonizing pain in his head, and was irritable and even abusive to anybody who molested him. His left leg and arm suddenly became unusable, and he at last took to a crutch. When out on the street one day he committed some violent act that resulted in his arrest, and, after spending two weeks in prison, he was taken to court, declared insane and sent

to the Dayton State Hospital, arriving there about the first of September. He was entered with a diagnosis of dementia precox. His lameness gradually subsided and he became more and more quiet and rational, and had for the first time been given the privilege of the grounds on the day that I saw him.

Now I leave it to my readers that this case, to any except a professional alienist, would have been pronounced at once a case of fracture of the vault with a hemorrhage occurring after a rather long symptom-free interval (Paget's), and producing slowly a compression of the right cerebral hemisphere. It appeared that way to me and after leaving Dayton I wrote a letter to the secretary of the Board of Administration, to whose care the legislature of Ohio has recently delegated the insane, reciting the circumstances, my opinion of the case, my interest in the boy and my hope that he would be thoroughly studied and, if necessary, trephined, in order to remove the clot and prevent a life-long problematic epilepsy. I received a prompt and businesslike acknowledgment of my letter, and I fondly hope that the boy has been professionally cared for and the State of Ohio saved at least the \$6,000 which average expense an epileptic boy is likely to entail.

New York and Illinois are without doubt the two leading States in the efficiency they show in the custody of the insane. As we have seen, New York has 31,265 lunatics and Illinois 12,881. Nevertheless the medical work in the Institutes of these two States is little more than routine. Indeed, the *esprit de corps*

of the medical incumbents in these two States, which is really the highest in the institutions of the country, does not look toward cure, toward discovering the causes of insanity or toward methods of possible prevention.

The State of New York, through its legislature, established the first institution designed for research to discover the causes of the insanities and some methods of cure or prevention. Van Giesen was appointed its first pathologist, but he soon gave up the task, and the Pathological Institute of New York became the Psychiatric Institute and a training school for the medical employees of the State hospitals in standardizing their routine duties. At the present time no investigations or researches are being made, and the Institute itself has become a clinical examining room in insanity. There are no research men connected with the institution, and no experimental work is done there. The State of Illinois tardily followed the State of New York in the establishment of a Psychopathic Institute. It was located at Kankakee in an abandoned building, and \$25,000 was appropriated in 1907 for its equipment. During the succeeding two years this equipment was exhibited by a director, whose salary was \$4,000 a year, and cared for by a janitor. The director gave his attention to training the medical staff of the various State Hospitals in routine medical work such as every hospital clerk has in a metropolitan hospital. The methods of conducting staff meetings were thoroughly established throughout the State, and

it is probable that Illinois and New York are the only States where staff meetings are held daily and new patients discussed and clinically diagnosed in all the institutions for the insane. During the following two years the legislature made available \$11,800 a year, and the Board of Administration appointed three men to work in the Institute under the director. It happened that three extremely original and capable men went to work and accomplished almost prophetic feats, but within a year and a half these men put in their resignations to the board and were let out of the State service. The research work which had already been established and conducted under almost disheartening circumstances, was entirely abandoned, and when the Institute was criticised by me for the collapse which it had suffered, the director informed all critics that the Institute was not established wholly for reasearch, but had other duties to perform, and that there was no likelihood of discovering any cause for any of the insanities, and research with an optimistic outlook was hopeless. Now it seems to me that the history of medicine is rich in showing the possibilities of the human mind and the human hand over the subtle depredations of disease, and the unknown in insanity is no more mysterious than was the unknown in wound diseases and the sleeping sickness.

By the persistent investigations of Pasteur and the application of these investigations by Lister, hospital gangrene, erysipelas and wound infection have become almost traditional. Through the researches of Bon-

net and Richet, Max Schüller and Robert Koch, tuberculosis is thoroughly understood, and means of its prevention have been made efficient in actually diminishing the death rate from this plague in an ever more and more congested population. Through the aperception and cunning of Klebs and Loeffler, diphtheria, which used to be the terror of parents and the despair of physicians, is thoroughly understood, and a quick, pleasant, and invariable remedy and prevention is provided.

Through the cunning and devotion of a long army of research men, typhoid fever, yellow fever, the plague, sleeping sickness and kala azar are now made clear and a possibility of their prevention and cure placed in our hands. Through these discoveries the tropics have been opened to man, and the first great work undertaken by our government in connecting the Atlantic and Pacific has been made an easy engineering feat, under the protection of an efficient sanitary corps.

It may be that the insanity of the young, known as dementia precox, which furnishes at least 20 per cent. of all the admissions to our lunatic asylums, and through their long life makes for more than half the population of these institutions, is a problem more difficult of solution than the problem of the wound diseases in their time, tuberculosis in its time, or yellow fever during the Spanish-American War, but if it is a more difficult problem it should be undertaken by a larger corps of research men directed by an optimistic

and determined endeavor to rob humanity of a scourge more to be feared than the cholera, the yellow fever, or the pest.

The conditions of research in psychiatry must be established by the States that now have all the insane under their custody. The laboratory of research in psychiatry must be fostered by the Boards of Administration and other commissions that now expend 40 per cent. of the gross budgets of our munificent commonwealths. It is a false economy that expends \$2,000,000 a year, as Illinois does, for the custody of 15,000 patients, and only \$11,000 a year in an institute devoting only a small part of its energy, and that in a fitful, pessimistic and irregular manner, to research. If the increasing burden of the State in the care of the insane is to be diminished at all it must be done by discovering the methods of preventing insanity or in the cure of the insane. At the present time there is no department of pathology or clinical medicine so no department of pathology or clinical medicine so fusion about the subject, a mystical cult has come forward with transcendental theories of mental aberration and has befogged and befuddled the minds of the alienists themselves. This has led to the same neglect of material pathology that we find among osteopaths and Christian scientists. If the forty-eight States that now care for their insane in State hospitals vigorously and optimistically prosecuted research into the diseases or conditions that underlie insanity, and if at the end of a reasonable time, say ten or fifteen

years, no progress had been made in elucidating the subject, or in preventing the disease, then it seems to me that such legislation should be secured as would place the unhappy dement, on the application of a "next friend," beyond his suffering by a legal euthanasia. I should claim the right of every friend and parent of the hopelessly demented one to appear in court and secure a legal order of execution for his demented friend or child, and require the sheriff of the county from which he was committed, to execute the hopelessly insane person by as painless and humane a method as that which the society for the prevention of cruelty to animals insists upon for the hopelessly injured or diseased animals and the unclaimed creatures in the public pound.

THE PROGRESS OF SEROLOGY IN PSYCHI- ATRY.

"Hic patet ingeniis campus."

In an endeavor so novel and so rapid in its progress as the application of the Abderhalden defensive ferment test to the diagnosis of disease, it is necessary to be alert in order to keep up with the marvelous demonstrations which are coming to us every day.

In the January 20 number of the *Münchener medizinische Wochenschrift*, Dr. A. Fauser, of Stuttgart, Germany, publishes his further observations which he began as soon as he had perfected himself in the Abderhalden method, in May and June, 1912. His previous publications appeared in the various medical weeklies and in society proceedings, and can be readily found by reference to his previous article in the periodical mentioned above and published on the 9th of September, 1913. He now continues a report upon work performed since that time, and especially his mature conclusions drawn from their results. It might be well to quote him rather fully but without making a very close translation. He says:

I again prefer the form of putting together results and facts in a more or less loose and unsystematic way, and I would like to have this article considered merely as suggestive and as furnishing a broader basis to build upon.

In my previous article I published an account of a case, Mrs. E. B., thirty-nine years old. She has suffered for many years of a painful obsession of absolute inadequacy, with a troubled conscience, constant self-accusation and chronic melancholy. The intervals were not entirely free of these depressing feelings, and were infrequent and brief. With it all she had feelings of great physical weakness. Her husband tells us that his wife suffered of goiter, which was worse when her mental condition was worse. She has had three miscarriages and four births. Two were said to be overtime, one normal. There is no history of syphilis, and the Wassermann was negative for both husband and wife. The uterus was slightly sub-involuted. There was no history of mania and no exophthalmic goiter symptoms. From the beginning the diagnosis was in doubt and verged toward manic-depressive insanity. The serologic tests were made and developed defensive ferments against fundamentals made from ovary, from thyroid gland, from hypophysis and from cerebral cortex. This was such a remarkable picture that the tests were performed again a few days later. The results were the same, but because the fundament for the hypophysis was used up this test was not made.

When the much emaciated patient had been built up somewhat and was sufficiently strong, a partial thyroidectomy was performed. The extirpated gland was examined by the pathologist, and showed the common picture of colloid degeneration with none of the characteristics of an exophthalmic goiter.

Ten days after the operation the patient seemed psychically entirely normal; her disposition was perfectly natural and she realized that she had been really sick. The serologic examinations were repeated, but

they were all negative, except with the ovarian fundamen-

ment. Fauser remarked upon the disease which he calls "*dysfunktion*" of the ovary in relation to the three abortions, and we may further say as much of the disease of the hypophysis, which the first examination showed, in relation to the delayed birth of the two overtired labors. In this patient there was a circle of diseased glands of internal secretion, of which that of the ovary was most profound and lasting. The blood could arouse effective defensive ferments only after a portion of the thyroid was removed.

Fauser was in doubt, as he might well have been, what would be the end of this case. Would the dysfunction of the ovary disappear or would this remain and the other glands in the circle go back again? In his last article he reports as follows:

Mrs. E. B. has been examined by me several times since the preceding history was taken. Her complete mental recovery has continued up to the present time—five months after the partial thyroidectomy. I neglected to mention in my previous publication that the urine in this case had always been free from albumin. The serological test, which showed positive reaction with ovary, thyroid gland and cerebral cortex prior to the thyroidectomy and showed a positive reaction with ovary only ten days after the operation, now five months after operation is negative, not only with thyroid gland and cerebral cortex, but also with ovarian fundamen-

My opinion about this case is that the *dysfunktion* of one organ, the thyroid gland, also put out of commission another organ correlative with it, the ovary, and that the latter organ, the ovary, after the dam-

aging effects of the former organ had been eliminated by the partial thyroidectomy, was able to resume again its normal catabolizing function. Therefore, it seems to be quite possible, if it is desirable to cure the *dysfunktion* of an inaccessible organ, to perform a surgical maneuver upon a more accessible organ in the group of disturbed organs, and thus influence indirectly the whole circle of disturbance. This is a matter of the greatest importance to the physician and the surgeon.

M. K., a boy of sixteen and a half years, is a bright and intelligent young fellow. In infancy he had rickets. When a little older he had *cholera nostras*. When a child, he was given large quantities of alcoholic drinks. He had suffered for some months of attacks of complete unconsciousness and irrationality, but of late he has been perfectly rational and exhibited no deception. He had a small goiter and exhibited a defensive ferments to fundament of testicle, of cerebral cortex and of thyroid.

Up to the present time, Mr. M. K., upon whom the partial thyroidectomy was performed three months ago, shows a very remarkable improvement. He feels so much better generally as he did a short time after the operation that he is able to think quicker, does not feel weary and tired out all the time, he is in better spirits, and has a much better memory. He can concentrate his mind more than ever before, and his father is very much gratified at his good behavior and more sedate and rational attitude. My last information from the father showed that this improvement had continued, except that he had run away again on two occasions. The serologic test, which had shown positive reaction with testicle, thyroid gland and cerebral cortex prior to the operation had all dis-

appeared four weeks after the operation. They were recently made again and still remained negative. It is very important in this case to note that after the partial thyroidectomy had been performed that the reaction not only disappeared for the thyroid, but also for the testicle with which it is correlated. It is too early to consider these two cases as absolutely cured, or even to draw generalizing and practical conclusions from them, but as long as we have no better weapons for fighting mental diseases that are now demonstrated by the Abderhalden test to be due to the *dysfunktion* of organs with internal secretions, it certainly will be worth while to follow up these suggestions. A kind of symbiosis between psychiatry and surgery has already sprung up in the treatment of exophthalmic goiter and by the obstetrical and gynecologic treatment of some of the nervous troubles of pregnant and non-pregnant women. This kind of symbiosis will undoubtedly become still more intimate between surgeons and psychiatrists.

One of Fauser's assistants is soon to report other surgical treatment which he has instituted in his clinic, as directed by the results of the Abderhalden reaction and his theory of the *dysfunktion* of the glands of internal secretion. But Fauser reports one particularly remarkable case, as follows:

This patient is a woman, forty-five years old, who has been in the custody of insane asylums for more than eight years, and, further than that, she had been kept in various private sanitariums four years previously, making in all, twelve years. She manifested the well-known combination of symptoms of a serious mental depression with feelings of humiliation, self-accusation, repentance and fear of the future with a

very decided weariness of life. She had made several unsuccessful attempts to commit suicide, and had frequently refused to take food. Fauser made an examination of her blood and found that it gave a positive reaction with cerebral cortex, but a negative reaction with fundament made from the ovary. He does not mention whether or not there was reaction to the thyroid fundament, but he made a diagnosis of struma, which was confirmed by physicians. Fauser suggested a partial thyroidectomy. The particulars of this operation will be published later. Ten days after the operation the blood showed no ferment against brain cortex, but there was a ferment against the thyroid gland. Ten days later an examination of the blood was negative, both to the fundament of brain cortex and that of the thyroid. One and a half days after the operation the patient said that the painful pressure and distress in her head, which had preyed upon her nerves for many years, had entirely disappeared, and that she was feeling greatly relieved. Her mental condition has continued to improve, but she has not become entirely relieved of her melancholy, and she does not look upon the future with a healthy optimism. The overpowering depression and melancholy are no longer hanging over her in the predominant manner they did before. She feels no inclination for suicide, which she had attempted just a few days before the operation, and she enjoys her meals, eating with a good appetite, while formerly she attempted to starve herself to death. Her nurse was discharged a few days after the operation, and the patient was removed from the locked and barred wards to the open ward of the hospital. She is in excellent spirits most all the time, thankful and cheerful about her condition and hopeful about a complete

recovery. She weighed sixty-eight pounds before the operation, and a few days afterwards her weight had fallen to sixty-six pounds. Three and a half weeks after the operation she weighed seventy-one pounds, and continues to gain. Her pulse, temperature and general condition are good, and she has a vivacious and healthy appearance.

This certainly is a very remarkable history, and we shall look forward to a fuller report from Fauser in subsequent publication as he has promised. It must be noted that while no case of typical clinical manic-depressive insanity has ever given any Abderhalden reaction to fundamentals made from any part of the body, especially from brain cortex, thyroid, liver, genital glands, muscles or nerves (the combination used for other patients in the insane asylums), and that all cases of dementia precox have invariably given reactions to the genital glands, this case, which was cured by a partial thyroidectomy, was a twelve-year-old melancholic verging between the two previous clinical forms. By means of the Abderhalden reaction, we have means of making a closer diagnosis, and we may hope for more rational and more effective treatment. Fauser has learned from the psychiatrist who had this lady in charge that early in the month of January he had examined her again and considered her mentally normal.

X. X. is a young woman, who has a sister in the custody of an asylum, suffering of dementia precox. She is twenty-six years old, and has been engaged in professional work, and shows externally no abnormal attitudes or erroneous conduct. A careful examination discloses some psychic and nervous symp-

toms, irrational fears, temporary delusions of hearing, voices of deceased persons, and other sounds. She is perfectly reasonable and intelligent, and is not at all under the influence of her hallucinations, but, on the contrary, she recognizes that they are pathological. She has a goiter, and the serologic test was slightly positive, with the fundament of thyroid albumin, but quite positive with that made from ovarian tissue. All other reactions were negative. In spite of the indecisive serologic results as far as the thyroid was concerned, we decided that this disturbance of the circle of the glands would be restored to the normal by partial thyroidectomy.

This case Fauser considers extremely interesting and important from a theoretical, and also from a practical standpoint, as it seems to give an insight into the cases of dementia precox which are sometimes termed latent. The *dysfunktion* of the ovary was extremely pronounced, as shown by the Abderhalden reaction, but that for the thyroid, which showed itself clinically, as a rather conspicuous objective symptom, was rather slight, and the Abderhalden showed no *dysfunktion* for the cerebral cortex. It is very likely that there are cases of intoxication in which one or more of the chain of glands of internal secretion are affected, and yet that one is not pronouncedly intoxicated, as in dementia precox, for example, the cerebral cortex, which gives the overshadowing symptom upon which the diagnosis is ordinarily made. The study of cases in the latent condition is likely to furnish material and suggestion through which the pathology of the disease will at last be unravelled. It seems likely that the immunity and the anaphylaxis which the

patient may offer, has a large part to do with the development of mental disease. Catatonia, itself, might be looked upon as an anaphylactic symptom.

What we have said above is wholly a matter of presumption, Fauser asserts, namely, that the *dysfunktion* of the germinal glands is secondary to a intoxication with an unknown element, but it is primary, as related to the *dysfunktion* of the cerebral cortex, or the thyroid, or other glands, in the circle of internal secretion. For the present Fauser uses it as a working hypothesis.

Drs. Byer and Fauser have both of them published accounts of examinations and tests in court. They have shown the practical application of the Abderhalden to the detection of dementia precox and other psychoses, and the separation of cases of simulation in those who are suspected of crime. (*Münchener Medizinische Wochenschrift*, 1913, November 4, page 2450.) This use of the reaction has still further shown its practicality in work which is soon to be published by Fauser.

In one case of a young woman, who seemed to show beyond a shadow of a doubt symptoms of a catatonic dementia precox, Fauser found a negative reaction to thyroid fundament, and also to that of cerebral cortex, but a slightly positive reaction with ovarian fundament. However, there was abundant evidence enough of insanity, and a positive reaction was made with the fundament of placenta, in spite of the fact that she had indignantly denied the possibility of pregnancy. Later events showed the reliability of the Abderhalden reaction in all particulars. Fauser sus-

pected that the *dysfunktion* of one organ of internal secretion, namely, the placenta, had, in this case, indirectly caused the *dysfunktion* of other organs in the correlating circle, and he was, therefore, about to recommend the production of an artificial miscarriage, when suddenly the entire mental picture of the case improved, so that she was discharged as cured after a stay in the institution of only six weeks. A complete serological and physical examination made a few weeks later showed that the improvement had gone on so far that the blood contained no ferment which would peptonize any fundament ordinarily used, even that of the ovary, which had been peptonized at the earlier examination. Several weeks after this examination, and just before Fauser's paper was published, another examination was made, with the same results, and her physical and mental condition sustained the negative findings to the ovarian fundament. Fauser says:

How important such a case is for the practicing specialist of mental diseases, I have pointed out already. From a theoretical point of view there seems to be a fair chance for making clear some forms of a pregnancy insanity which are hitherto not quite clear—neither about their pathogenetic, nor diagnostic, nor prognostic features.

Fauser has made, up to the present time, a careful serological examination of considerably more than five hundred patients. Of these he has complete clinical histories, together with more than three thousand individual serological conclusions.

To be sure, this is but a beginning, but it is a

worthy beginning in the serological pathology of the psychoses, especially of those psychoses that are to be observed in the institutions for the insane. It is not, however, by any means, a complete picture of the serologic findings we look for, nor can it compare at all with the morphological achievements in pathological histology, as represented by the work of Nissl and Alzheimer. The most important work of Fauser relates to the clinical group known as dementia precox, and it seems to place these patients in several quite distinct categories. In all of them the genital glands are first affected, and the *dysfunktion* in these glands is carried over into the other glands of internal secretion, and at last to the brain cortex, where, without doubt, the mental symptoms of the disease arise.

In epilepsy, too, the Abderhalden reaction has shown that the *dysfunktion* of the cortex is secondary to that of some other unknown gland of internal secretion. Fauser remarks, quite cogently, that every institution for the insane must now undertake the study of the patient by means of the defensive ferment reaction, the same as it was compelled to do a few years ago when the Wassermann proved of such value in the study of general paresis.

When this paper is taken in connection with Wegener's recent report of six hundred cases examined at Jena, we must admit that a new era has come for psychiatry. Therapeutics must take a larger part in our institutions. Cure must displace custody. Research must crowd out institutionalism. Optimism must be the watchword where pessimism has groveled in political atrocities.



THE CURSE OF PUBLIC MEDICAL SERVICE IN THE INSTITUTIONS FOR THE INSANE.

The fashion now prevails of appointing the servants of the board of control by a so-called civil service examination. This at once hedges about the service with delays and uncertainties that lose the State many good men. The examinations are infrequent, at no fixed dates of general knowledge, and they are of uncertain extent and character. They rarely give a man of individuality an opportunity to show his qualities.

The State service is so classified that the medical men follow one line to promotion. They begin on a small salary, with routine medical duties and then, as the salaries increase, they must leave medical work and take up administration and business. This not only disparages the medical service itself, but it discourages men who do not wish an administrative career but would like to continue in the State service as scientific medical men. The business of administration should be separated from medical affairs in so far that a medical man need not seek an administrative office in order to get a living salary.

The time was, long before telephones and rapid transit, when the medical staff had reason to reside in

the asylum with patients. That time has now passed. Yet married men who ought to make the best sort of medical officers are not willing to live more than a year or two in the quarters assigned them in the asylums and eat at general commons with wife and children. Good medical service cannot be maintained without providing for medical servants a higher standard of family life.

The very isolation of the institutions for the insane renders attention to the family life of the physicians and nurses of prime importance. It will generally be accepted that the nurses are of the greatest importance to the efficiency of a hospital, and yet no part of the hospital work is more unsatisfactory to-day. This is largely because no efforts are made to provide a proper, adequate and suitable social life for these public servants. Every physician and every nurse must have an adequate social life. Provision must be made for this life by the board of control if service of good quality is desired. In most institutions the pay of the plumbers and engineer is more than that of the medical men of equal seniority and the provisions for their social and family life are more reasonable.

I am very well aware of the fact that protracted service in the State institutions does not always secure good men. Some of the inertia which interferes with the passage of the State asylums to State hospitals comes from "holdovers" who are as helpless of securing a medical position in the world outside these institutions as the maniacs under their care would be.

They occupy places and maintain a bland and mysterious attitude toward patients and friends of patients and a pessimistic and sophistical attitude to any change or betterment. They are the tradition-bearers of the State service. They are the emblem-bearers of the charity idea. They are quick to get into any band wagon that comes along; now it is re-education; now it is non-restraint, but always it is "me for my little place on the public pay roll."

Heavy as these incubuses to the progress of our public medical service seem to be, the need of continued medical service for capable and ambitious public-spirited scientific men is much greater. If the State institutions are not doomed under the care of the boards of control to a complete arrest of progress, such as the Iowa institutions now typify, to the pursuit of a business man's efficiency model such as we see in New York and Illinois; then we must have not only a different sort of civil service examination, but a provision for continued medical service with increasing pay and higher standards of life. Internes may live for a year or two in commons but assistants ought to be provided with houses either on the grounds or near at hand.

But even these details, important as they are, can never give the State a medical service which we can be proud of. The whole spirit of the State service must be changed. The idea of custody, with the slow elimination of each annual incoming crop of the insane by starvation, by tidy neglect and by institutional disease,

must give place to research into the causes of the underlying disease and the possibilities of cure and the prevention of insanity. When the young physician comes into the service of the State in the institutions for the insane, his first months are months of idol breaking. He finds his notions of the State service were erroneous. Nobody has any responsibility or takes upon himself any obligation. He sees men with distended bladders go on to rupture without surgical relief. He sees patients with extra dural hemorrhage kept without help for months and discharged "improved." He sees patients, emaciate, starve, succumb to secondary infection and die without professional help, all because the State institutions are manned by incumbents and not provided with obligation-bearing and power-carrying medical men.

It is a rule as old as Hippocrates that the physician must serve his patient without digression dictated by the interests of others. The physician, though paid by the State, must still be a doctor and hold to no interest except that of his patient. It is the doctor's duty to cure. If he cannot cure, if he cannot investigate, if the opportunities for studying, treating and caring for his patient are denied by the conditions of his service, he is a criminal to his profession if he does not resign at once. He is in no better position than the abortionist, the hired murderer and the quack. Unless the service of the State medical faculty is organized for research, for cure and for the prevention of insanity, no honorable scientific man will knowingly enter the

service, or, having ignorantly entered it, will long remain in the unprofessional and un-Hippocratic position required in order to draw his pay.

Our people don't want the insane huddled up to die at the lowest rate *per diem* consistent with local decency. They really believe, as I did myself, that in these great caravansaries for mental miseries such scientific medical researches are made and such measures for cure and care are prevalent as prevail in reputable self-supporting hospitals.

In every State in the Union, custody awaiting death is the rule, research for cure or prevention is the vagary of those unadaptable physicians who are considered by their colleagues madder than the maniacs confined.

The Phipps Institute at Baltimore is about to open. Only time can tell whether it marks a first step toward reason and research or a monument to mysticism and Freudianism.

THE "BUSINESS" OF KEEPING THE INSANE. IS THERE A BETTER WAY?

This is truly the age of the business man. He represents the dominant idea of the present generation. To him supply and demand, credits and debits, discounts and balances, are dieties whose very nods are not to be questioned.

In the frenzy for business efficiency in the public service which swept the country a decade or two ago, the management of the then termed "charities" of the several States was placed in the hands of commissions known as "Boards of Control," "Boards of Administration," and the like, made up very largely of business men, given unlimited power and discretion and very considerable salaries. The members of these boards were generally appointed by the governor, and in the State of Illinois, for example, they were made "non-partisan" by requiring that each of them should be avowed members of some political party, and, therefore, representative of the several political cliques! In Illinois, also, one of the board must be a physician, and he is termed the alienist.

As a matter of fact, the Board of Control is made up largely of business men who make politics their business. To these business men the State institutions for the defectives, the dependents and the delinquents are so many plants. These plants are a physical asset

in which the patients are economically a negligible incident.

The institutions meet their approval when they are in perfect physical condition; the roofs, when they shed water; the windows, when they let in light and look nice; the floors, when they are sound, smooth and well-polished; the plumbing, when it does not smell or leak; the water-works, when they supply water uninterruptedly with economical and efficient consumption of fuel; the heating apparatus, when it heats and does not cost too much; and so on to the very garbage consumer and the graveyard. Where the inmates come from, what brings them there, how long they remain, and what becomes of them when they go out is no concern of these "business men." Order, economy and efficiency are their gods. The hospitals for the insane please the Board of Control when the average expense per patient per day is about twenty-eight and six-tenths cents, and the wards are clean and quiet, and no scandal gets into the newspapers.

It matters not how fast the wards fill up; how little the patients are studied and treated; how rapidly in the confinement and hot air, and the dark, illy-constructed day rooms, these insane patients deteriorate and become demented and tubercular. The ward must be quiet, or, if disturbed, the disturbed patients must be kept out of sight and hearing.

The Board of Control has a great "business" for all sorts of mechanical improvements. They are much troubled over the inflammability of anciently constructed buildings, and they are eager to replace them with fireproof structures. They are anxious about the

sidewalks, the pumping stations, the barns, the hen houses and the turnip patches. They carefully inspect every piece of land in any part of the State offered for a new institution, and measure its political and vote-getting advantages, and when compelled to do so they buy a fine piece of land next door to a powder mill, pay for it, and with the State money. They travel over the country from Maine to Oregon, inspecting the recent architecture for madhouses, and then call in the State architect to materialize the results of their research. The contracts are let, the buildings are erected, and the patients are moved in.

When the new plant houses about 2,800 lunatics, the Board of Control fixes the maximum number of attendants at about 200, and provides for 125 other sane helpers. These are all supplied from the eligible lists of the Civil Service Commission, where such a commission exists. The lists are rarely full and adequate, because the pay is inadequate and the conditions of service are unsatisfactory. Eight or ten physicians, besides the superintendent, are allowed to such an institution. These physicians are generally young men who have had little or no hospital experience, and take a year or more in the State service, because they are too poor or too timid to undertake the risk of an independent practice. The plumbers, the engineers, the farmers, the gardeners, the butchers, the bakers and the semi-skilled artisans generally have salaries in excess of or equal to the doctors, and also an eight-hour day.

In their acuteness for business and their strict regard for economic equity, we have never known that

any of the working patients are allowed by any Board of Administration a just compensation or credit for their work, although they save the State a large amount of skilled and unskilled labor, and some of them are in the service of the State with no more interruption than the paid laborers, for periods of five, ten, fifteen and twenty years. No patient or his family so far has been paid for a life-long service in a State institution.

The windows and doors of most of the institutions are barred and bolted like prisons or reformatories, and, although they bear the name "State Hospital" and house 2,800 lunatics, they frequently are devoid of the most essential equipment characteristic of a hospital. They are often without the necessary outfit for the armamentarium of a country doctor in a village of half the population.

In some States the faculty of each institution holds a daily staff meeting and patients are presented for diagnosis, prognosis, and even for a discussion of the etiology of the disease. In Illinois, this has become an established custom through the efforts of the director of the Psychopathic Institute, and in most of the institutions of this State, very long anamneses are dictated to stenographers, written out on the typewriter, and filed away for the protection of the present administration and the enlightenment of future generations. Laboratory work of a simple sort is generally provided for, and it has occasionally happened that a lively and congenial bunch of young medical men in an isolated institution generated a scientific *esprit de corps*, and worked up a research

to a point where some material thing was required of the Board of Control, during a time when its president was off on a political campaign for senator of the United States. The requisition for the equipment was held up, the patients under examination died or were removed, the enthusiasm of the physicians cooled down, and, worst of all, the leaders of the co-operating bunch were scattered like so many soldiers to other institutions and the good work came to an end.

In Michigan, in Iowa, and in Wisconsin there are no central schools of instruction, like the Psychopathic Institute at Kankakee, Ill., or the Psychiatric Institute at Ward's Island, New York. The Psychopathic Hospital at Ann Arbor, Mich., is an independent and unco-ordinated affair, devoted to psycho-analysis, and incidentally the clinical instruction of the students of the University of Michigan in Freudian mysticism. Staff meetings in the institutions for the insane in Iowa have not been regularly held, and when they were held they were apt to be solemn and portentous ordeals. The Board of Control in that State is uninspired by any ideals, sociologic or philanthropic, and the physicians who keep their jobs must hide their ideals, if they have any, or express them with great discretion.

In Wisconsin, the acute insane only are in charge of the State, and when they become obviously incurable and chronic, they are returned to the several counties and kept in jails and poorhouses. This is the State of progressive legislation.

The conditions in Ohio are about like those in Iowa, except that many of the buildings for the asylums

are older. There has been no research in that State except at Gallipolis, and the medical service has been at the lowest ebb of political jobbery. Plumbers, electricians and the farmers are paid higher salaries than physicians, and there have been few, if any, staff meetings for scientific purposes and no regular anamneses of the patients are kept up as in a hospital. The Board of Administration is administrative of a lot of poorhouses, called State hospitals, and a colony for epileptics that was once leading the research of the world in the study of epilepsy. The medical attendance in the Ohio State hospitals is inadequate. In one State hospital of 1,800 lunatics, for example, there are two physicians. The superintendents have too much "business" and politics to attend to to visit the wards. The nursing, like that in the other States, is unprofessional and unskilled, and the atrocities perpetrated by attendants on the patients are very numerous. In this respect Ohio can not outdo Illinois, where a nurse was convicted in March, 1914, of murdering a patient under his care, which patient, an old paretic, had been in the Kankakee State Hospital only four days. This murderer of an old Jew was sentenced by the judge at Kankakee to serve sixty days in jail! Such is the fine precedent for a nurse, Stansky by name, who is now in Cook County jail for killing a patient under similar conditions at the Chicago State Hospital in February, 1914.

The efficiency craze is on in business, but it has not reached the medical service of the State hospitals in any State where I am acquainted. There is little classification of patients. The medical service is

inadequate, and, for the most part, therapeutically pessimistic and nihilistic. Until the late tuberculosis revival the insane patients had no outdoor treatment. Now lunatics who have been fortunate enough to come down with tuberculosis as a result of custody and of architectural confinement are put out in the cold and the sun, and a few of them get well of their consumption and their lunacy also. In order to get rational treatment in the State Hospital the committed citizen must first get tuberculosis.

The efficient State Hospital should be rid by colonization or boarding out of all but the hospital cases. These patients should be treated like sick folks, like typhoid, like pellagrins, like rheumatic patients. The efficient Board of Administration should be alert to follow out the Code of Charities (of Illinois) and stop the incoming stream of the sick and cure those on hand. This Code of Charities in its preamble distinctly sets forth this command to the Board of Administration and makes it their duty: "*To provide humane and scientific treatment and care and the highest attainable degree of individual development for the dependent wards of the State. To promote the study of the causes of dependency and delinquency and mental, moral and physical defects, with a view to cure and ultimate prevention.*"

Under this preamble and in accordance with another section of the Code, the Psychopathic Institute was established at Kankakee. The first two years the annual legislative appropriations for its support were only \$4,000.00, just enough to pay the director. The next two years the appropriation was \$12,500.00 a

year, and four men were put to work, but strangely enough left the State service within eighteen months! During the present biennium, \$17,500.00 a year, all that was asked for of the legislature, has been available, and two men have been employed besides a few stenographers, but only one of these is left at the end of the first year!

This collapse of the Psychopathic Institute at Kankakee is like the wilting of a flower when the root is destroyed by worms. The loss of the spirit that established the Code of Charities of Illinois is shown by the collapse of the Psychopathic Institute before it had borne fruit. The conditions in New York are similar. The Psychiatric Institute is a training school for the faculties of the New York State Hospitals, but it is *not a laboratory for research into the causes, cures and methods of prevention of insanity*. No physical researches have been undertaken there since the early incumbents threw down their tools at the immensity of their job, and their disgusting terror at the conditions of the insane. One of the directors has even boasted that he was too wise to undertake to solve an unsolvable problem.

If any change is to come over the conduct of the State hospitals it must come from some other source than the Boards of Control or the present incumbents of the medical berths. We need scientific statesmen and patriotic scientists to solve the threatening problems of insanity. The metaphysical dabblers who psycho-analyze the maniacs and interpret dreams are inefficient fakirs in the madhouses of the State and should be smudged out.

The chronic, working and inactive insane should be in colonies and in household and family care under State medical and administrative supervision. The acute hospital insane should be treated like tubercular, rheumatic, and other sick patients. On them the physicians should work to cure. Everything that science offers should be utilized. Their attendants should be professional; their surroundings, rationally curative and not certainly disease producing. There should be established in every psychiatric hospital or psychopathic institute, vigorous, aggressive and optimistic research. There must come upon the Boards of Control a vision of an army of the friends of the insane demanding research and cure. They must see the citizens who pay the taxes exacting research in the early stages of the disease in schools and in courts for juvenile offenders, and demanding the abolition of catechismal psycho-analysis and dream interpreting clairvoyancy. The research must be scientific, mechanistic, physical, chemical and biologic. Research into causes, research into pathology, research into prevention and research into cure, these are the researches to be prosecuted by the Boards of Control in the Psychopathic Institute.

Again we say, there is no hope for improvement from within. The Boards of Control have the power, but not the motive. The friends of the insane are so distracted and paralyzed by the terrible calamity that has beset their families that they turn helplessly from the subject because it causes the healing wounds of their hearts to bleed and ache. The problem is one for the citizen, the statesman and the legislator. The

recent revelations of the Abderhalden reaction in psychiatry put at rest forever the contention of the psychogonists that the "twisted idea" is the primal cause of the condition which the lawyers call "insanity" and the physician calls "disease." For general paresis and the alcoholic psychoses there is now absolute diagnosis, rational prevention and medicinal relative cure; for manic-depressive insanity there is treatment, rational and hopeful, and for dementia precox, that makes up more than 60 per cent. of the 200,000 insane in custody in public asylums of the United States, there is now in the Abderhalden defensive ferment reaction a positive serologic diagnosis, which gives marvelous hints of possible etiologic discoveries. Our keepers of the insane are still maintaining their pessimistic inactivity.

Belgium has long demonstrated the way to care for the chronic and some of the acute insane in the colony at Gheel. This ancient community has harbored the insane for six centuries or more. Beginning with a sort of refuge about the church, where the insane found shelter, the custom has grown of entertaining the sick in mind and miraculous cures have taken place. With a population of 14,000, this county takes care of something more than 3,000 patients in their homes. Within the district, the insane suffers no restrictions, but wander about from place to place and work and play as they please. They are everywhere "entreated kindly" just as visitors or neighbors are, and where night overtakes them they sleep in the apostles' room. The central receiving station long presided over by the celebrated director, Dr. Peeters,

has accommodations for only sixty or seventy patients. After the newcomers have been thoroughly studied they are assigned to the care of families accustomed to the treatment of their particular form of the disease and skillful in managing a particular manifestation of conduct disorder. Some member of each family is an officer of the State and is responsible to the directors, to the inspectors, and to the physicians, all of whom make regular visits and frequent reports. The pay that the family receives is small, and yet it aggregates a sufficient amount to make the county of Gheel a very prosperous one. About the village there are located many amusement places where the insane go and mingle with the other patrons. Very few disorders are reported. A disturbance or unusual interruption of church service, lectures, music or dancing is taken care of by the experienced attendants always about.

During the past fifty years only twelve sexual misdemeanors have occurred; three of these were rapes and the other nine pregnancies of demented or irresponsible patients. Such a report compares favorably with the custodial care in the most prison-like institutions of England and America.

1. It is my claim that the great fault of the present administration of the institutions of the insane lies in a failure to appreciate and provide for research into causes, into prevention and into the methods of cure of the diseases. We spend thousands and millions for custody and practically nothing for research.

2. The Board of Administration should separate the acute insane from the chronic, and place the latter

in colonies of large size, conducted in a manner similar to the community at Gheel, or like communities in France and Argentina.

3. All the insane persons who work continuously in the institutions for the insane should receive pay. This should be set aside for their own use, or for the benefit of their families.

4. The Psychopathic Institute should be a part of the university of the State, and its educational and scientific work should be conducted upon the highest educational methods and with the highest educational standards, and its work should be rewarded by certificates and diplomas, the same as if it were done in any of the departments of the university on its own campus.

5. It should be the demand of the friends of the insane that the attendants and nurses serve only eight hours a day and have such professional standards as will forestall the atrocities which are now a routine occurrence. The "beating up" of insane patients by nurse attendants should be drastically punished.

6. The medical service of the institutions should be adequately paid and the conditions of life for the families of physicians should be such as to insure protracted service. The superintendents should be independent of politics.

7. The nurse attendants should be for the most part trained female nurses and adequate provisions should be made for this residence outside the grounds.

THE DIAGNOSIS AND TREATMENT OF DEMENTIA PRECOX.

Dementia precox, or the insanity of adolescence, occupies a unique place in medical practice and medical literature. It is not mentioned in Osler's "Modern Medicine," nor in his textbook, of which one hundred thousand copies have been sold. Fifteen thousand youths afflicted with this "*disease*," however, are committed to the madhouses of the United States each year, and they are pronounced incurable from the start. The management of these madhouses in Illinois (for example) is in the hands of five politicians, only one of whom is required by law to have any medical training or any knowledge of the problems of insanity.

No layman, and but few physicians, will believe me or anyone else when, in utmost seriousness and humiliation, we assert that *no effort is made* by any member of the Board of Administration in Illinois or by any of the faculties of the ten institutions under their direction to study the conditions of these unfortunate youths. The eight superintendents, who are political appointees, are full of "business," feeding, housing and attending the many social needs of their irresponsible and helpless wards. The medical care of these unfortunates is intrusted to young physicians who have had little or no experience, and who get out of the service as soon as they can, if they are

good for anything, because they can not endure the unprofessional conditions of their environment.

When a youth suffering from dementia precox is committed to one of these institutions he is locked into the ward, where he becomes noisy and boisterous or sullen and silent. In the former case, he is likely to be "beaten up" by the "nurse attendants" until thoroughly cowed and humbled. The attendants are omnipotent and remain in the institutions through all changes of administration. If catatonic, the patient curls up in bed and starves. The death rate during the first year is high. At the end of this year there is apt to occur a change—an adaptation. The emaciated patient—with swollen tongue, jaws protruding like an ape's, teeth rotting from neglect, hands, feet, legs and arms deformed from catatonia, abdomen and cheeks retracted from starvation—begins to wake up and becomes active, or, on the other hand, he sinks to lower depths. During the first year of confinement to bed the patient is filthy half the time, lying in a bed wet in his own urine and befouled with his own offal—a picture of neglected misery that can not be described, and that cries to civilization for correction or else euthanasia.

With this terrible picture, putting 300 great blots on the map of the United States where over 120,000 dementia-precox patients are consigned to a pessimistic and nihilistic custody; with the boards of control of forty-eight sovereign States, expending for this custody of these wrecked citizens nearly \$50,000,000 annually, or four-tenths of the budget of the several States; with a suffering, but ignorant

public, composed of the friends of the insane behind them and begging for betterment; with all these things, I say, they make no effort, spend no money and encourage no sacrifice for research for discovering the cause of this grave malady, or for finding some cure or way of prevention.

In Illinois, a research institute was established by the Code of Charities (1907), but with a legislative appropriation of over \$17,300, only two men are employed in its Psychopathic Institute.

How to Study Dementia Precox.—Fortunately, during the past year and a half, the application of the Abderhalden reaction to psychiatry has proved, beyond a possibility of discussion, that dementia precox is a “*disease*,” of which the mental symptoms and the deterioration are but incidents. Dementia precox is not a perversity of conduct, a twisted idea or a curse of God. It is shown by this reaction that the pancreas and the genital glands are undergoing a degenerating process, as liver does in alcoholism and the thyroid gland does in exophthalmic goiter.

This terrible disease is slow in its onset, as a rule, and is characterized by a peculiar pupillary condition, a peculiar loss of weight, a peculiar perspiration, a peculiar arrest of growth of hair, a peculiar atrophy of the lower leg, and a peculiar condition of the blood. One may learn to recognize the disease by the two clinical methods—that of the asylum, where many cases can be studied in many stages of the disease, most of them in terminal conditions, and that of the physician, who sees one or two cases often in each succeeding stage of the disease. There is no

doubt that each of these clinical methods has relatively some advantages over the other.

There are two more methods of studying the disease that ought to be utilized, but which are rarely employed. They each offer to the serious student employing either of the previous methods (the super-ranted pessimism toward dementia precox, and reports actual recoveries after the use of sodium nucleinate.

Lundvall's Prescription.—The most important and significant contribution to the treatment of dementia precox comes from Halvar Lundvall, of Lund, Sweden. He uses a very concentrated solution, and has reported eighteen cases, of whom six actually recovered, and all but three made remarkable and very desirable improvement. His report was obscurely published more than a year ago, and some improvements have been made in the preparation of the remedy at the "Apotheke Kjorten" in Lund. These improvements have been communicated to me by letter, and Mr. L. Breckwoldt, of Sargent's drug store (23 North Wabash Avenue, Chicago) has prepared the remedy according to the following formula:

Quassini depurati sicci.....Gm. 2.0

Aquæ destillatæ.....C.c. 50.0

Boil in a water bath for one and a half hours, filter, and add

Hetoli (*i. e.*, sodii cinnamati).....Gm. 1.0

Sodii nucleinati.....Gm. 10.0

Acidi arsenosi (in solution).....Gm. 0.005

Boil until all is dissolved, filter, and add

Aquæ destillatæ bullientis, q.s. ut fiat.C.c 50.0

This remedy should be kept in a dark, cool place. It does not need to be resterilized.

In anticipation of the use of this remedy, the patient's blood should be examined and the leukopenia demonstrated and recorded; the bowels should be opened with calomel at night and a saline laxative in the morning, followed by an enema consisting of four quarts of hot water (105° F.), to which a tablespoonful of glucose (corn syrup) has been added.

Then one or two cubic centimeters of the remedy is injected into the buttocks or other neutral place. In about six hours and after a slight chill, the temperature will be found to be 102° or 103° F., and the leukocytes will rise to 20,000, or even higher. The red corpuscles will go down nearly to normal, falling from 6,000,000, or higher, to 5,000,000, or even to 4,500,000. There is usually an increase in urine. The reaction is stronger after the first and earlier injections, and later it is necessary to increase the dose even to 15 or 20 c.c.

The only guide as to the time for the next injection is the examination of the blood. The temperature stays up only a few days, but the leukocytes, in one of my cases, remained above 25,000 for five weeks. When the leukocytes fall below 12,000, then the dose should be repeated. When the reaction, as measured by the leukocytes, begins to weaken, the dose should be increased by one or two cubic centimeters.

Treat Like Tuberculosis.—During all the time, the patient should be treated like a tuberculosis patient. Cold air, sunshine and a good feeding—3,000 to 5,000

calories a day—are desirable. The daily bath and glucose enemas keep the patient clean and tidy. If the patient is mute and inactive, he must be taken to the toilet regularly, and great care must be taken with his teeth. Calomel and laxative salines often are necessary.

When it is possible, the patient should be exposed to the sunlight, cold air and rain, just as Dr. A. Rollier, of Leysin, treats his patients suffering from surgical tuberculosis ("Ergebnisse der Chirurgie und Orthopödie," Vol. 7, pages 1 to 146, and Interstate Medical Journal, March, 1914, Vol. 21, pages 279 to 284).

The uniform effect of these injections has been noticed by everyone. There is a change. Every patient whom I have injected has gained weight, one as much as twenty pounds in six weeks. This is what might be expected, as the Abderhalden reaction shows a *dysfunktion* of the pancreas—and the pancreas is the lipose generator, the enzyme of fat metabolism.

It will be noticed that the hair grows more rapidly. If the forty-eight hour growth of the beard on a definite part of the face, cut before injections are used, is carefully laid on gummed paper, or, better, measured with a micrometer, it will be found that, after the injections, the forty-eight hour growth is at least half as long again. One mute catatonic, weighing less than eighty pounds, who had been fed with a nasal tube for three months, was led to the table a few days after the second injection, and, with a little urging, fed himself. Interest in life increased in one

young man, and he said he was "urged from within himself to eat and exercise and try to get well."

None of my patients treated with Lundvall's remedy have been examined by the Abderhalden method, but there was no doubt in any case of the diagnosis of dementia precox. Every State institution ought to be able to make Abderhalden tests, and then this hopeful and promising remedy could be given an adequate and a conclusive trial.

If any reader of this article undertakes, from these directions, to treat one or more patients with Lundvall's remedy, either as prepared under his direction at Lund or by Mr. Breckwoldt at Sargent's drug store in Chicago, or by any expert pharmacist, I should be greatly obliged for a full, complete and unabridged report.

Don't expect too much in a short time. Keep up the remedy with every possible improvement in the general hygienic conditions. As soon as interest can be aroused, cultivate it, but do not exhaust the patient. One young man, who had not written or spoken a word for four years, after the sixth injection, wrote his own name on a little urging. His weight increased ten pounds during the same time, he stood up straighter and walked better, going two or more miles twice a day.

Although I have used the remedy on only a few patients for six months, and every patient has improved, some have become more troublesome for this time. In an institution, the troublesome patient gets himself disliked.

It seems to me the remedy should be thoroughly

ficial study of many in a short time or the intensive study of a few over a long time) the greatest assistance in correcting misconceptions.

The laboratory method has been little used, and can be fully utilized only in the large general hospital, with a research institute attached, like that at the Michael Reese with its Morris Institute, or that at the Presbyterian with the Institute for Infectious Diseases, both of Chicago. There has been little laboratory study of dementia precox. Even the condition of the blood has been only superficially observed, and hardly any co-ordinate studies of blood, metabolism and conduct have been made. Therapeutic and laboratory investigation have not been undertaken.

The study of the literature of any medical subject is necessary to a full comprehension of all its intricacies. The literature of dementia precox, under that name, is only twenty-five years old, but, now having the clinical entity well in mind, we can go back through the European literature of three hundred years and recognize the type; also even in the ancient Egyptian (in the Papyrus Ebers), for example, 1500 B. C., a clear picture of the disease is discovered. All four of the methods of studying the disease are necessary for its comprehension, namely, the prolonged and intensive study of one case, the superficial study of many cases, the laboratory study of one or many cases, and the reading of the world literature of the whole subject.

Dementia Precox Characterized.—From such a study as this, we conclude that dementia precox is a

condition appearing usually at the beginning of adolescence. It may make itself known at any later period. Its earliest manifestations are metabolic, and associated with various symptoms. In one case, it is simply nutritional; in another, skeletal; in still another, glandular. Various accidents and sicknesses precipitate the disease. The joints, the apophyses, teeth, the tonsils, the intestinal functions are all and each apt to feel the intoxication. The use of the Abderhalden reaction in early cases has not as yet been reported, but one can readily guess that some remarkable disclosures in this direction are bound soon to appear.

The mind of the patient is apt to be greatly stimulated and the patient is prone to overdo in the beginning, but his vision and genius-like labor is followed by inactivity, depression and apparent dementia. There are illusions, hallucinations and delusions of mind, which result in errors of conduct; but dementia does not actually come on, and the patient, starving, mute, dirty, inactive and fed with a tube, is perfectly conscious of his surroundings and remembers everything, has regrets and remorse, terror and fear, and suffers all the pain that rational persons do. These subjects are also perfectly cognizant of ill treatment and kind treatment, but their delusions modify their conduct. They perceive, they conceive, but they can not execute. In catatonia, they have muscular rigidity and in its early stage the condition is denominated negativism.

From a similar quadrajugate study, we conclude that there is no etiology, pathology or treatment of

this disease yet recognized. The prognosis is always bad. Recovery is unknown. The duration of the disease is unlimited. While many cases terminate early in death, the great majority live to acquire tuberculosis or other intercurrent or institutional diseases, and die—five, ten, twenty or more years after commitment. The disease rests at times and the patient becomes an uncomplaining drudge about the asylum, after earning a man's wages for the State.

Enter the Abderhalden Reaction.—The first light is thrown upon this disease by the Abderhalden defensive ferment reaction. This method, introduced by Fauser,¹ of Stuttgart, in February, 1913, and continued by him and by a great army of biologic chemists and serologists in Europe, has shown that the genital glands are disturbed in every case of dementia precox—the ovaries in females, the testicles in males. In catatonic cases, the thyroid gland also is disturbed. In every advanced severe and terminal condition, brain-cortex also is involved. The later, and perhaps more happy work of Fuchs and Fremd,² shows that the pancreas is as early disturbed as the genital glands, perhaps even earlier. The patients afflicted with other insanities, especially manic depressive insanity, show none of these reactions.

Our study of the literature of this terrible disease, the etiology and pathology of which are unknown, shows little hope of successful treatment. Some do

¹ Fauser, A. D. m. W., February 13, 1913, Volume 39, pages 304-307.

² Fuchs and Fremd. M. m. W., February 10, 1914, Volume 61, pages 307-310.

get well, especially after an attack of the infectious disease, and now and then a recovery is reported; just as in the seventeenth, the eighteenth and the early part of the nineteenth centuries cases of successful laparotomies were reported. In Massachusetts, when one out of 1,500 admitted were reported recovered during a seven-year period under examination, the medical officer making the report was severely criticized.

Now it has happened that Bruce, Dide, Fischer, Halvar Lundvall and Julius Donath have reported recoveries by the production of an artificial hyperleukocytosis, and this is the reason for writing this paper.

Has a Cure Been Discovered?—Lundvall made the most careful and extensive examination of the blood of the insane under his care, and developed the observation that there exists a polycythemia and leukopenia when the dementia precox patient is failing, and a hyperleukocytosis and normal number of red corpuscles when the patient is improving.

In England and on the continent, the nucleinate of sodium has been used to increase the leukocytes and produce improvement. One of the great objections to the use of this agent was the large quantity of water—50 to 100 c.c.—necessary, and the pain resulting from the injection of the large doses employed. Ittau, Fischer and Donath have reported betterment, and even recoveries from its use. Julius Donath, in a recent essay, charges the psychiatrists with unwarranted, as it is painless and produces no abscesses. It is a thoroughly rational procedure. The patient's

weight increases under its use. The inactive patients become active and thus cause more trouble, but they could hope to recover only by becoming more active.

The publicity given the method by *The Literary Digest* of March 7, has brought me a large correspondence and has aroused several centers of active therapeutics for this condition. I have in every case answered the letters and begged for reports of success or failure, and I shall hope to have a more exact and comprehensive report in a few months.

The editors of this journal have undertaken to assist in furthering the treatment by supplying the remedy for experimental use when it can be administered under reasonable and favorable conditions:—*The American Journal of Clinical Medicine*.

THE GLANDS OF INTERNAL SECRETIONS.

It is very difficult to select a proper title to this paper which deals with an individual and isolated view of the anatomy, physiology and pathology of some of the glands of internal secretion. But titles are of little use except for the purposes of the indexers.

The secretion of a gland is in some way dependent upon the morphology of the cell elements of the gland. This makes it possible for nutritive or waste elements of the blood to be taken up and utilized by each of the several glands, producing new materials wholly different from each other, but each of them necessary to the growth and repair of some or all of the tissues of the body. It has long been possible to recognize the various glands of the body and distinguish one from another by the microscopic appearance of their several structures. A thin section of the thyroid is easily distinguished from a similar section of the thymus. A colored film taken from the hardened, fixed and imbedded testicle can be distinguished from a similar film taken from the ovary.

It is only recently, however, that it has been possible to recognize the remarkable fact that each albumin molecule of which the cells of these several glands are constructed is wholly different from those in any other gland or any other part of the body.

This means much in trying to understand the remarkable power of each gland to elaborate a secretion so different from that of every other gland and yet elaborate it out of the same nutrient material that it finds in the blood. The albumin molecule is one of the largest and most complicated known to chemistry. It contains an enormous number of elements and is almost visible under the microscope. The formula which is usually given is only approximate, but it shows the great possibilities of combination, even in a geometric series. It is ordinarily written $C_{720} H_{1134} N_{218} S_5 O_{248}$.

This formula does not express anything except the number of pieces in the molecule. It is parallel to saying that a Remington typewriter is composed of 360 screws, 54 bars, 88 types and 172 pieces of framework and other metals. Each piece must be in definite relation to each and every other piece in order to make a functioning Remington machine. The albumins that build up the cell elements of each gland are as different from one another as a typewriter is different from an automobile, or as a dynamo is different from a gasoline engine. And so, also, are the products of each gland different from the products or secretions of every other gland, although they derive their pabulum from the ordinary nutritive elements of the blood and lymph. Of course, this analogy does not explain the marvelous powers of gland selection and secretion, but it does suggest how the results of the secretion of different glands are able to be so different from each other. The typewriter produces the written page, the gasoline engine the energy that

can be used for different purposes, the dynamo produces an electric energy and the automobile a method and means of transportation. But these results are not more different than are the secretions of the thyroid, the adrenal and the ovary.

There is another question that comes into the mind at this point and its answer is quite positive and marvelously significant. Are the albumin molecules of corresponding glands in related animals *identical, similar or wholly unrelated?*

This question has been positively answered by the defensive ferment reactions. They are similar, but they are not identical. It appears, for example, that the albumin molecules, the building stones, of the thyroid gland in man are about as like the albumin molecules of the thyroid gland of a dog as is a Remington typewriter similar to an L. C. Smith machine. This likeness and unlikeness has unusual significance in the proposed implantation of glands and in the administration of glandular extracts in the so-called organo-therapy of the present day.

When we come to consider glandular secretion as dependent upon the molecular construction of the gland, we see at once from analogies in inorganic and organic chemistry the great importance of physical conditions, such as temperature, light and motion, to the activity of gland secretion. The whole organism becomes a retort in which reactions are taking place different in quantity and quality as the temperature rises and falls, as dilutions and solution take place and as concentration results in crystallization, separation and fixation. The mechanistic view of the pro-

cesses of life seem more rational, more reasonable and more promising of great achievements in physiologic and pathologic research.

There is, unfortunately, no exact separation of the ductless and the ductile glands either by their morphology, their functions or their secretion. Most of the larger glands are not only ductile and excretory but also ductless and secretory, and one part of a gland may have one function while a closely related part, as in the pancreas, for example, quite another function. Even glands with ducts may carry the secretory portion into contact with the digestive mucosa in order to bring about changes in the nutritive processes, and other portions of the same gland may throw secretory products into the lymph and blood streams. Every gland in the body, from the sebaceous glands of the skin and the mucous glands of the liver to the highly specialized glands of the thyroid and the pituitary body, have secretory functions of the most vital and essential nature. As an excretory apparatus we recognize the importance of the skin. It excretes almost as much solid and liquid material as any other excretory organ, but we rarely consider the secretory value of the skin, although we recognize its condition as one of the most obvious indications of health or disease, of youth or age when we are making a clinical examination.

The various glands are of extremely timely development in the course of the life of the organism. The genital glands are conspicuous examples. They have the reproductive function during only a small portion of life. The thymus is more active in intra-uterine

than in extra-uterine life. The same may be said of the pineal body and the hypophysis.

There is an equilibrium in the action of the various glands of internal secretion and this results from a stimulation of one by the secretion of another. In our very incomplete knowledge of the function of the several glands it is not easy to explain the antagonistic action of, for example, the adrenal and the thyroid. We recognize, however, the constricting power of the adrenal and the dilating power of the thyroid on the capillary circulation. The same conditions prevail in the capillaries of the brain and the other organs. The thyroid promotes digestion, reproduction and cerebration. The adrenal restrains each of these. The thyroid promotes cardiac strength and activity, the adrenal restrains each of these. The pituitary is closely related to the function of the pancreas and the genital glands, and its irritation or destruction results in glycosuria of pancreatic origin.

Each gland seems to have a peculiar supervision over, or stimulation of the growth of some part of the body. The pineal gland, which early undergoes an atrophy and degeneration, seems closely related to the growth and maturity of the sexual apparatus and the secondary sexual characteristics. When it is hypertrophied, the penis, the testicles and the hair about these organs are prematurely and abnormally developed. A boy of six or eight may present a sexual apparatus as large and as active as that of a man of twenty-five. The pituitary body also has a supervision over and stimulation of the growth of bone. If during puberty and until maturity it is over-

active, giantism is the result. The hyperpituitaryism may and does occasionally produce a polydactylism if it is present at an early moment of embryonal life. The adrenal gland seems in some way related to the condition of the cerebro-spinal lymph circulation and the cerebro-spinal lake. In hydrocephalus and in many cystic conditions of the neural canal, the meningocele is not a result of defect of bone but is due to some incompetency of the adrenal apparatus.

Now it comes to the point where we must consider the errors in the activity of the glands of the body and the causes which lead to these errors. It is generally allowed that a gland may be:

1. Normal, *i. e.*, it secretes a normal amount of normal, healthy secretion.
2. It may be overactive and secrete too large an amount of a normal secretion.
3. It may be underactive and secrete too small an amount of a normal secretion.
4. It may secrete an abnormal secretion in any amount.

The normal amount of the normal secretion is such an amount as to secure bodily health. It varies with the nutrition, the activity of the body and the exigencies of disease. The secretions of some of the glands, such as those of the pancreas and the spleen, vary with the amount and kind of food undergoing digestion. The thyroid is more active when the body is trying to rid itself of toxic elements, the result of infection. The conditions of this hyperthyroidism are not yet very well understood, but we have all observed clinically the appearance of a thyroid tumor

with some chronic antral disease or in a case of exacerbating pulmonary tuberculosis.

Recently one of my patients with completely obliterating arthritis of both hip joints of seven and a half years' duration, told me that three years after the ankylosis he had a rapid growth of a goiter with rapid heart. He had the goiter removed without any attempt on the part of his physicians to find the cause of the goiter or the arthritis. This cause I found in the pyorrhea alveolaris, and the proper dentistry resulted in the disappearance of the arthritis and the remaining goiter. Sphenoidal sinus disease has been occasionally looked upon as the cause of pituitary irritation in adults, and pancreatitis must now be considered as secondary to cholecystitis in the vast majority of cases.

Peripheral infections throw into the circulation a vast amount of dead albumins. These albumins are toxic and the various glands of internal secretion are aroused to a defensive action. The morphologic elements of the blood, especially the white corpuscles, must be looked upon as possessing glandular qualities. By them the defensive ferments are produced that have the power of catabolizing the albumin molecules into dialysable peptones and aminoacids. But after this process has gone on for a long time, some one of the glands of internal secretion may be so thoroughly irritated as to take on a hyper-, a hypo- or a dys-function. If it is the thyroid that suffers, then we have, as a result of some remote intoxication, an athyroidism and myxedema, a hyperthyroidism or a dysthyroidism or Graves' disease.

But it is not always such an obvious and acute condition that results in dysthyroidism. It may be some chronic inherited disease that ruins a life by early destroying this essential life-enriching gland. The abdominal viscera are more often affected by syphilis than the thyroid is, but protracted malnutrition is also characterized by the appearance in the blood of undigested foreign proteins from the contents of the viscera. These ill-digested substances are just as toxic to the glandular elements as the products of malarial, tuberculous or syphilitic disease. The younger the patient the more important the glandular function, the more likely it is to suffer irreparable injury.

Here we must notice the fact that the placenta albumin escapes into the circulation and produces a toxemia in the pregnant woman with the same disastrous effect at times upon the glandular systems. How often have we all noticed the hyperthyroidism of the pregnant woman. How uniformly do we see her blood losing its protective power over the infections of the mouth. The teeth fail in their resisting power and decay. And yet we do not always relate these symptoms to the invasion of the blood with the toxic placental albumin.

This is a condition dangerous not only to the mother but to the unborn child.

Not long ago I was requested to make an Abderhalden defensive ferment test of the blood of a seventeen-year-old feeble-minded girl, for whom a transplantation of an ovary had been recommended by one man and an oophorectomy had been suggested

by another. This girl responded to the Binet-Simon eight-year test only. Her history was enlightening. The mother was a strong, rather masculine appearing woman, only twenty-eight years old, when she became pregnant with this, her second child. Her previous pregnancy and delivery, three years before, had been uneventful, and the girl born was large, and is, and always has been extremely healthy. But this time the morning sickness was excessive and quickly passed into a nephritis. Her legs were swollen and her abdomen was so excessively distended that she anticipated twins. However, at the seventh month she gave birth to a living girl baby. There was a condition of hydramnios. The baby was always sick. She had measles at six years, and sooner or later every other disease in the country neighborhood in which her parents lived. When sixteen years old she menstruated once, but during the succeeding year not at all. During the past five months she has menstruated regularly. Her weight is eighty-six pounds. Her hair moderately developed. Her hands are unusually stubby and the fingers clubbed. Her face is thin, the eyes are close set and small, the nose, lips and lower jaw normal. The bite of the closely set teeth is good. The thorax is normal but not large; the breasts are large and bouncing; the abdomen and pelvis quite womanly. The thighs are very large and hard and the mons richly covered with hair. The genitalia are highly developed. The legs are strong and sturdy but short.

The Abderhalden reaction showed defensive ferments against pancreas and pituitary, and was nega-

tive for six other parts of the brain, the ovary, the liver, the placenta and control.

During the past year and a half much evidence has accumulated, showing the disease of the ductless glands are usually plural rather than isolated and single. The thyroid and thymus are afflicted in Graves' disease, the pituitary with the thyroid and the adrenal in acromegaly; the genital glands in dementia precox with the thyroid, the pancreas and the cerebral cortex in late stages. Pluri-glandular disease is the rule rather than the exception. In the imperfect state of our science we can not say why the particular group of glands are associated in any special toxic condition, but we have become alive to the fact that the disturbance of the function of any gland is *secondary* to some toxemia, and one English author urges us to look for infection or diseased processes in each of four general localities, remembering that glandular disease may result from the coincident workings of two or more remote infections. These four localities are: (1) The mouth; (2) the nose and its sinuses; (3) the respiratory tract, and (4) the digestive tract. An old lung tuberculosis may be reinforced by an acute pyorrhea alveolaris or Rigg's disease, introducing exophthalmic goiter. Overwork, bad hygienic surroundings or a slight injury in a recovered tuberculous person may bring about a fatal Addison's disease.

A new interest has been aroused in the glands of internal secretion by the demonstration that dementia precox is uniformly attended by a breaking down or catabolism of the genital glands, the testicle in boys

and the ovary in girls. This was Fauser's application of the Abderhalden reaction in psychiatry. In the United States not less than 15,000 youths of high school age are committed to our madhouses each year with this hopeless condition. The disease is looked upon in about the same light as tuberculosis was looked upon a few years ago, *e. g.*, as an hereditary and hopeless malady dependent upon intrinsic individual defect. Now we know that tuberculosis is not hereditary, that it is dependent upon contagion and that it is preventable and in a large measure curable. We have just learned through the Abderhalden defensive ferment reaction that dementia precox is a toxemia affecting particular glands of the body and that this toxemia has a rational and tangible cause which is susceptible to investigation and only awaits the research of a Koch, an Ehrlich or a Klebs to make it as clear and plain and doubtless as preventable as tuberculosis is to-day.

The secretions of these glands are enzyme-like. They act not as molecules to become utilized and consumed or fixed, but as go-betweens to bring about union or disunion between elements of the body.

The effects which follow the destruction or dysfunction of one of these glands of internal secretion vary with the period of life at which the dysfunction appears. In intra-uterine life they are terrible, and, fortunately, result in conditions inconsistent with extra-uterine life. Unfortunately, however, many of the deformed and defective infants live to the great discomfort of their parents and the confusion of our profession.

Among the causes of the dysfunction of the glands of internal secretion in the unborn child are syphilis of one or both of the parents, placental intoxication of the mother, severe disease of the mother, or her drug intoxication with the inevitable invasion of the mother's blood with undigested albumin. It is likely that the study of our defective children in the light of the rapidly growing knowledge of the pluri-glandular dysfunctions would show that a considerable portion of the born defectives were crippled by preventable conditions.

The growth of infants, as shown by the yard stick and the scales, has become a fixed part of pediatric inquiry. When called to a sick child the physician now consults the mother's chart of weight to see when and how the child stopped growing—to see if the child is at a resting stage in growth—on one of those plateaus waiting to get the pluri-glandular apparatuses in some new adjustment for a new stage of existence. We all notice when the sexual glands come to their maturity in the boy and girl because of our dominant interest in all sex manifestation, but we fail to notice the external symptoms of a retarded thymus, a deficient pineal body, an irritated pituitary. We do not know why some of the intellectual functions fail to develop in the child that seems to stop too long on one normal mesa of retarded growth, and the individual remains ever after, not necessarily imbecile, but short of that acute intellectuality that is a joy in life.

The nutrition of the child must be guarded in order that the blood streams may never be clogged with

imperfectly excreted or digested albumins. The doors of infection of the child of civilization must be kept free of all invasion in order that the normal development of successive glands may not be interfered with and the coincident mental development, on which civilization places so much store, may not be diverted, perverted or arrested.

It is not alone in the bizarre manifestation of pluri-glandular disease that we as physicians find our greatest interest, but in many common conditions, such as osteomalacia, fragilis ossium, rachitis, arthritis deformans, adiposa dolorosa, glaucoma, arteriosclerosis, diabetes, nephritis, hysteria, and even common colds. The care of the teeth; the condition of the tonsils and the very habits of sleeping and eating take on new significance when we consider their relation to the ductless glands. Even dress in swathing the skin in a moist poulticing atmosphere and the heating apparatuses of our habitations are instrumental in increasing the risk of pluri-glandular disease.

Not alone is health and normal growth dependent upon the equilibrium of the pluri-glandular system, but even the disposition, the character and the temperament of an individual depends upon the character, the quality and the regular function of these basic organs of life. It is well known that energy is closely related not only to general nutrition but to the healthy and normal condition of the sexual functions. The quality of motherliness is a condition subsequent to all that makes a mother. The grasping, sour, contracted disposition and narrow view of life which all literature has bestowed upon the miser, are qualities

incident to adrenal and parathyroid hypersecretion, and they are distinctly antagonistic to a healthy and vigorous thyroid, pancreatic and genital function.

Any system of eugenics which fails to consider the disturbances of the pluri-glandular system as secondary to errors of nutrition, infection and injury, will fall short of realizing any improvement over the present "catch-as-catch-can" method. A deficient thyroid and an imperfect function of the cerebral cortex is no more a contraindication to reproduction than a mutilated eyeball or a broken leg.

Conclusions.—With so many things to say, and so many that are, perhaps more interesting than what has been said, let me suggest the following particular recommendations:

1. Every provision should be made by the medical attendant and by society to protect any pregnant woman from sources of infection in the mouth, in the nose and in the digestive tract, in order that her blood may not become surcharged with extraneous toxic albumins leading to the discomfiture of her glands of internal secretion and the retardation or dysgenesis of the developing fetus.

2. The treatment of any glandular or pluri-glandular defect should not neglect the early elimination of any infection in or about the teeth, in the gums, in the sinuses of the face, in the natural cavities of the intestinal tract, in the posterior urethra, or in the calices of the kidney and the haustræ of the colon. Surgery of the thyroid, the thymus and the pituitary should follow unsuccessful but strenuous efforts to remove all the cases of dystrophy of these glands and

eliminate from the blood all undigested nutrient albumins. The study of the course of such cases can be very greatly aided and the prognosis guided by the frequent census of the defensive ferments contained in the patient's blood.

3. Since syphilis, malaria and other parasitic diseases are common causes of pluri-glandular disturbance, the exclusion or treatment of these conditions should never be omitted.

4. The beneficial action of light upon the glands of the skin is indisputable, and the action of light upon the sick thyroid, or the action of its substitute, the X-ray, has a promise of betterment which can not well be neglected before the dangerous thyroidectomy can be recommended.

5. The treatment of many conditions of obscure origin which are now known to be related to the disturbances of the secretions of the pluri-glandular system, such diseases as arthritis deformans, osteomalacia and gout, should receive the same careful elimination of all sources of toxemia both in the digestive tract and in the other loci of ordinary infection.

6. The use of gland extracts in the treatment of aplasias of the pluri-glandular system has become an established therapeutic measure of miraculous potency. It should be preceded by the elimination of all sources of toxemia, and the fact that the extract of any particular animal fails should not lead to discouragement but to a renewed investigation and the administration of extracts from the analogous gland of some other animal. When the thyroid extract from the sheep has failed, that from the goat should be tried, and

when the thyroid extract of both of these has failed to give a satisfactory reaction, then the thyroid extract from some carnivorous animal should be tried out.

7. The transplantation of glands presents a fascinating topic for experiment which promises marvelous benefit in desperate cases. The technique of transplantation is, however, extremely difficult and its application rests upon many conditions difficult to control.

